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Radiological Clinic: Creighton Medical College, St. Joseph's Hospital*

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WE have the pleasure of being able to show you three clinical cases this morning, all of them interesting in some particular phase. The first one, which is now before you, is a white male, age forty-eight years, who entered the hospital one week ago with the following history, which will be read by Interne Dr. Grace:

CASE NO. 24160

CASE HISTORY: J. K., a white male, 48 years of age, who has been engaged in the cigar business, walked into the hospital complaining of a sore on the back of the tongue, accompanied by difficulty in swallowing and lumps in both sides of the neck. His previous history is essentially negative, except that he had a venereal sore on the penis twenty-five years ago.

His present illness began six months ago, when he developed a sore on the back of the tongue on the left side in the region of the molar teeth. He thinks he cut the tongue on a jagged tooth. Three months ago a nodule appeared in the left side of the neck, which rapidly enlarged until the whole tongue became thick, hard, and made it impossible to swallow solid food. Since that time he has had much pain, has been unable to sleep at night, drools constantly and has lost 70 pounds in weight. When he consulted his physician six months ago the blood Wassermann test was four plus, following which he received thirteen intravenous injections of neosalvarsan.

PRESENT FINDINGS: At the present time the blood Wasserman test is negative both by the incubation test and ice box method. The urine is negative. A complete blood count shows hemoglogin, 80 per cent; white cells, 4,880,000; polys, 75 per cent; small lymphocytes, 24 per cent; large lymphocytes, 1 per cent.

X ray examination of the left mandible shows no bone pathology.

Physical examination reveals an emaciated white male with normal physical findings except in the neck and mouth. There are palpable glands varying in size from one to three centimeters on both sides of the neck. The root of the tongue is enlarged and very hard. On looking into the mouth the tongue is seen to fill the mouth. The gloved palpating finger feels the entire tongue from tip well back into the pharynx boardlike. A deep ulcer with indurated margins is found on the left posterior quadrant. The induration is confined to the tongue. The mandible and the cheeks are normal. The breath has a very disagreeable, foul odor.

DISCUSSION: As the history and physical findings were read to you, several significant facts were doubtless noted. Briefly, the record shows that about six months ago the patient noticed an ulcer on the dorsum of the posterior left quadrant of the tongue. This ulcer was painful and the portion of the tongue about the ulcer was hard and from the ulcer a foul-smelling odor was noticeable. This odor has a peculiarly pungent quality which, once smelled, can never be mistaken for any other. This odor is found in carcinomas involving moist surfaces where necrosis is present.

The history is significant in that it shows the induration gradually advanced until at the present time the entire tongue is of boardlike hardness. As one places the gloved finger in the mouth, he is impressed with the extreme hardness of the induration and as the finger is passed around over the tongue the entire organ is found involved. The crater-like ulcer can be felt on the dorsum of the left posterior

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quadrant, extending slightly to the right of the median line. The induration is confined entirely to the tongue itself, no evidence being found of involvement of the jaw or cheek.

Now, let us palpate the neck. At once we find the root of the tongue is distinctly palpable and is felt as a hard mass occupying the central portion of the neck and movable with the hyoid bone, but extending below the hyoid as far as the larynx. In addition to the tongue, several masses varying in size from one to three centimeters in diameter are found on both sides of the neck. These masses have the feel and are in the proper location for enlarged lymph glands. The patient swallows liquids with great difficulty.

He has lost 70 pounds in weight during the past six months. This loss of weight is doubtless due to the fact that he is unable to swallow food sufficient to give the required caloric value, as well as the fact that he is suffering so much pain that he is unable to obtain sufficient sleep during the night.

An early diagnosis in this case was not made by his medical adviser because of the fact that a positive venereal history twenty-five years ago was obtained and because a blood Wasserman test was four plus. Let us inquire into this a little. Secondary lesions of syphilis are always found in the mouth as mucous patches, which are multiple and are accompanied by the skin eruption. The primary lesion of syphilis is occasionally found in the mouth. The most common site is on the lips or the tip of the tongue, but rarely is it on the posterior half of the tongue. Tertiary lesions of syphilis are rarely, if ever, found in the tongue. In this particular case the lesion could have been only of the tertiary type if syphilitic. The patient is of the cancer age, with a venereal history twenty-five years ago, the initial lesion being on the penis. In this patient the induration in the tongue steadily advanced in spite of thorough saturation with antisyphilitic medication, which was continued until his Wasserman test is now negative. The diagnosis of advanced carcinoma of the tongue cannot now be questioned.

Let this case stamp our memory indelibly with the fact that a patient who has had a previous syphilitic infection and who now has a four plus Wasserman test may also have cancer. In other words, let us exercise our clinical judgment in drawing conclusions about the patient, using the various laboratory tests as a part of the evidence rather than letting them make the diagnosis for us.

TREATMENT: Surgical treatment would only be of value were it possible to remove the entire growth with sufficient certainty to justify the risk of the operation. In this case, removal of the entire tongue would be necessary, as well as dissection of the cervical glands on both sides of the neck. The patient has refused this operation and we think he acted wisely. Gastrostomy will be held in reserve to be used when indicated. Radium

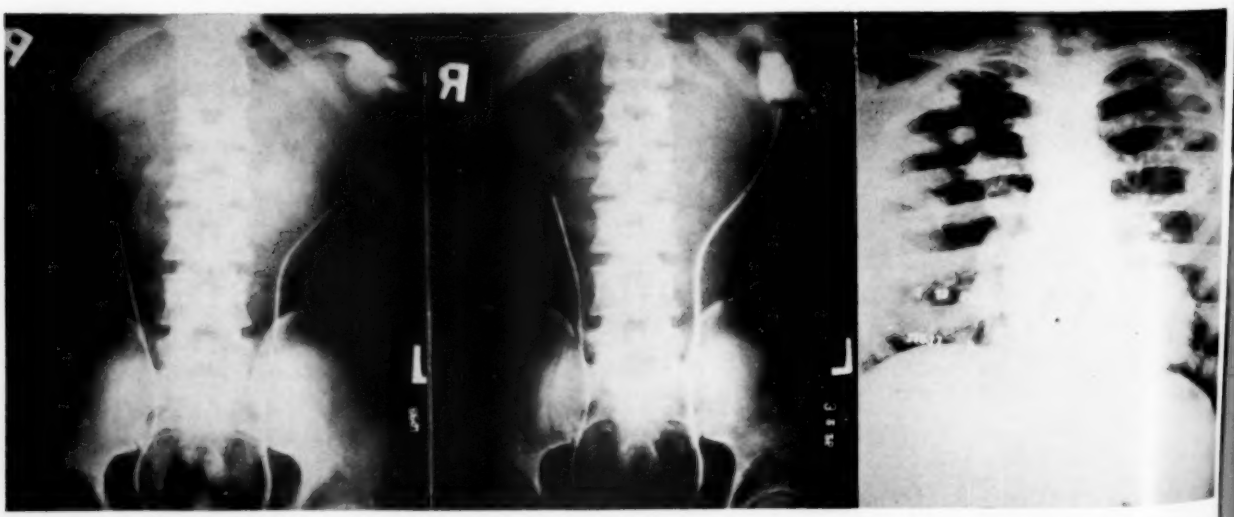

Fig. 1—Pyelogram of Case No. 23834, made before treatment was instituted. The left kidney is pushed upward and outward and the pelvis is flattened. The right kidney pelvis is not injected.

Fig. 2—Pyelogram of same case ninety-six hours after treatment was instituted, the day the last treatment was given completing the series. The left kidney pelvis is less flattened and rests nearer the spine. Right kidney pelvis not injected.

Fig. 3—Radiogram of chest, showing multiple circumscribed areas of increased density (new growths) in both lungs. Metastatic through the blood stream from a teratoma of the left testicle in a boy of 17 years.

treatment with quantities ordinarily available would be painful and result in considerable local irritation and discomfort.

High voltage x ray therapy offers the patient the most help with the least discomfort. This treatment can be applied not only to the entire tongue but to the cervical glands as well. The dosage will be administered in such a manner that all the involved tissues receive practically a homogeneous radiation. This can be accomplished by measuring the thickness of the part and from this measurement estimating the proper dosage for this particular patient. The technique employed will be governed by the following factors: Voltage, 200,000; distance, 50 cm.; filter, 1 mm. copper, 1 mm. aluminum; milliamperes, 4; time—as indicated by the measurements.

(Note: Two weeks after the treatment indicated above the size of the tongue diminished 20 per cent, the glands had reduced 50 per cent and the patient was able to swallow soft food, showing the value of radiation as a palliative agent.)

CASE NO. 23834

CASE HISTORY: E. A. B., a white male, aged thirty-two, walked into the hospital complaining of constant aching pain in the back and upper left side of the belly. The pain has been present for about two months, is gradually increasing in severity until now it keeps him awake most of each night. Recently he has noticed a swelling in the upper left side of the belly.

His previous history is negative until February, 1924, when he thinks he "strained himself" lifting. Following this he developed a swollen left testicle. His physician put him to bed for one week, applying hot packs, after which he returned to his work as street car conductor. The testicle remained large and when at work he felt a constant dragging sensation so that he was forced to consult his physician again. Operation was recommended and in May, 1924, the left testicle was removed. The testicle was largely occupied by a solid, new growth, which proved on microscopic examination to be teratoma. The cord was pulled down and cut off as high as possible. An uneventful recovery was made.

The patient returned to work and remained well until February, 1925, when he began to have backache in the upper lumbar region, slight at first, but gradually increasing until he was forced to give up his occupation. As the pain became more intense he also noticed a swelling in the upper part of the left side of the abdomen.

PRESENT FINDINGS: Physical examination is normal except that the left testicle is not present. There is a small scar in the left side of the scrotum where the incision was made for removal of the testicle. The inguinal and iliac glands are not palpable. A palpable mass is felt occupying the left upper quadrant

Fig. 4—Drawing showing the method of transillumination of the testicle to differentiate between hydrocele and solid tumor.

of the abdomen, where it seems to push out from underneath the left costal margin, extending to the median line and downward to the level of the navel. The mass feels smooth, solid, is not movable and no notch is palpable. The median and inferior borders are rounded. The colon rests in front of the mass.

Cystoscopic examination made by Dr. McMartin shows the bladder normal with normal urine flowing from both ureters. Functional test is normal. Opaque catheters were passed into both ureters and 15 per cent sodium iodid solution injected into the left kidney pelvis to tolerance, after which a pyelogram was made, as shown in Fig. 1. The pyelogram shows the left kidney pelvis flattened and displaced outward and upward beyond the normal

limits. The blood count is normal except for a slight secondary anemia and the blood Wasserman test is negative. X ray examination of the lungs fails to demonstrate metastases.

DIAGNOSIS: Taking into consideration the history of removal of a teratomatous left testicle, followed by a retroperitoneal mass in the upper quadrant of the same side of the abdomen, coupled with the displacement of the left kidney outward and upward by the mass and with normal function of the left kidney, we are forced to conclude that we have here a teratomatous metastasis into the periaortic glands.

TREATMENT: Our surgical consultant, Dr. Simanek, thinks surgical removal impossible.

Radiation therapy, then, is the method of choice.

Radium in quantities ordinarily available is also impractical. High voltage x ray therapy can be applied in such a manner as to give practically homogeneous radiation through the mass and should retard the advance of the growth or even diminish its size and thus relieve the pain. In fact, high voltage x radiation was given the patient three weeks ago and you are now seeing what has been accomplished by it. You can see a definite tanning of the skin of the abdomen and the back over the area treated. You notice that there is no prominence in the left upper quadrant and when you palpate the abdomen you notice the mass is scarcely palpable. The patient tells us that he is free from the back pain.

Someone has just asked how the treatment was given. The patient was put to bed and thoroughly alkalinized by giving Soda Bicarbonate, gr. xxx, every four hours during the course of treatments. When the patient was taken to the treatment room he was placed upon the treatment table in the position to be used. The area to be treated was marked on the skin with an indelible pencil. With calipers the thickness of the parts was measured. From these measurements the dosage for this particular patient was estimated, using the Dessauer charts as modified by Bachem. The following table is copied from his treatment record:

From the above table it is seen that the skin over the abdomen and that over the back received 112 per cent of the arbitrary erythema dose adopted as our standard. We have learned by experimentation and by experience that 120 per cent of this arbitrary dose will cause vesication. This patient demonstrates the necessity of carefully estimating the dose in each case. The erythema or tanning of the skin which you see here is that produced by 112 per cent of the skin unit dose. In giving this treatment the following technique was employed: Voltage, 200,000 (peak); distance, 50 cm.; filter, 1 mm. copper and 1 mm. aluminum; milliamperes, 4; time, 150 minutes anterior and 150 minutes posterior. This dosage was broken up into four successive daily applications. We have found the patients bear the treatment much better when administered in broken doses.

DISCUSSION: Following the first application over the abdomen, the patient vomited once. At no other time during the course of treatments did he vomit. Forty-eight hours after the first application considerable reduction in the size of the mass could be detected by palpation. Ninety-six hours after the first application marked reduction in the size was demonstrable both by palpation and by pyelogram, as shown in Fig. 2.

At the end of one week further reduction had occurred and at the end of three weeks the mass is scarcely palpable.

It is my opinion that the rapid reduction in the size of vascular new growths following radiation is due to devascularization. It has been proven by extensive investigation on the part of Warthin, Ewing and others that within twenty-four hours after radiation the endothelium lining the blood vessels becomes markedly swollen. This increases until the lumen of the smaller capillaries is occluded, thus shutting off the blood supply. While the devascularization process is going on the action of the rays on the parenchymal cells is getting under way, the two processes healing by fibrosis. The end result, then, of radiation is fibrosis.

Part	Depth Ant.	Depth Post.	Per Cent Ant.	Per Cent Post.	Per Cent Total	Dose Ma. Min.
Skin	0	20	100	12	112	600
Tumor	10	10	43	43	86	...
Skin	20	0	12	100	112	600

In this particular patient the growth is so large that we can only hope for palliation, relieving him of pain and prolonging his life six months to two years beyond which he would live if untreated. We know of no other agent which can accomplish as much.

This case runs true to form for teratomas of the testicle. They metastasize very early, usually before the diagnosis is made. They metastasize by both the lymphatic route, as in this case, and also by the hematogenous route. Because of the large percentage of metastases through the blood stream it is quite necessary to make x ray examination of the chest in all these cases as soon as they present themselves. Figure 3 demonstrates this point.

Frequently teratoma of the teticle is mistaken for hydrocele. There is a very simple test which can be made by anyone, anywhere, which will differentiate between hydrocele and solid tumor of the testicle. To make the test, take a piece of heavy wrapping paper about 8½ by 11 inches in size and roll it so the diameter of the lumen is about one inch. Holding the scrotum and affected testicle up, place the end of the paper tube against one side in such a manner as to exclude all light. While an incandescent light is held near the side of the scrotum opposite the paper tube the eye of the examiner looks through the tube. If hydrocele, the tumor is translucent, if a solid tumor it is opaque. By this simple test early positive diagnosis can be made, which, followed by early surgical removal, will minimize the chance for distant metastases—demonstrated by Figure 4.

CASE NO. 24228

CASE HISTORY: Mrs. L. H., a white female, 36 years of age, is admitted, complaining of a large tumor in the abdomen, which is accompanied by occasional attacks of sharp pain, loss of weight and weakness. Her family history shows that her father died at the age of fifty from carcinoma of the stomach, while her mother died at the age of seventy from cancer of the spine.

The previous history of the patient shows that she was married at the age of eighteen. She has four living children and has had five miscarriages. In 1922 she had a cholecystectomy.

In January, 1923, while running to catch a street car, she developed a severe pain in the left side of the abdomen which incapacitated her. During the physical examination to determine the cause of the pain, the physician found a very large tumor occupying the left half of the abdomen and extending slightly to the right of the midline. An exploratory laparotomy proved that mass to be a large spleen. During the past two years the tumor has slowly increased in size. Two additional attacks of severe pain in the spleen have occurred. At other times certain areas in the spleen become very tender to pressure. She has lost 22 pounds in weight and has gradually grown weaker, together with a growing sense of weight in the abdomen.

PRESENT FINDINGS: The patient is anemic and quite thin, with a protruding abdomen, which is found to be occupied by a mass extending downward to the pubes and to the right of the median line. The mass projects out from under the left costal margin, is firm, has a sharp edge in the upper right portion of which is a definite notch. There is no fluid in the abdomen. The liver is not palpable and there is no jaundice. There are no enlarged lymph glands.

Blood count shows 60 per cent hemoglobin; red cells, 3,872,000; leukocytes, 6,450; polys, 52 per cent; small lymphocytes, 45 per cent; large lymphocytes, 3 per cent.

Blood Wasserman test is positive three plus by the ice box method. The urine is negative.

DISCUSSION: After hearing the history and finding such a large spleen, one naturally thinks of splenomyelogenous leukemia, but as soon as the blood picture is obtained leukemia is ruled out, since there is no increase in the white cell count and there are no abnormal cells present.

New growth of the spleen is thought of because of the fact that both her father and mother died from cancer. Her age, however, is against that diagnosis, as well as the absence of any demonstrable primary growth and the extreme rarity of new growths in the spleen.

Malarial spleen comes up for consideration, but the patient has never had malaria nor has she ever lived in a malarial district.

Banti's disease must also be considered. In favor of this diagnosis is the insidious onset, the tumor having attained practically the size you see here today without the patient knowing it until found by her physician. The attacks of acute pain in the spleen are frequently

associated with Banti's disease. She has developed a considerable anemia, with no characteristic blood changes. She has lost 22 pounds and has grown very weak. She has had four healthy children and five miscarriages during her married life of eighteen years. She also has a three plus Wasserman test.

Taking all of the evidence into consideration, I feel that we are justified in making a diagnosis of Banti's disease.

TREATMENT: Surgical removal of the spleen is generally conceded curative in Banti's disease. This has been attempted in this patient and found impractical. She is being treated medically by rest in bed and the administration of iron and arsenic by mouth.

Today we shall begin the series of high voltage x radiation, cautiously administered in small, broken doses, introducing into the spleen only about 40 per cent of the skin unit dose. After a six week interval we shall probably repeat this dose if conditions warrant.

NOTE: Seven months after the above treatment, the patient is able to do her own housework, and her spleen extends only a hand's breadth below the costal margin. She has gained 20 pounds in weight.

Electricity in Pelvic Diseases of Women*

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ULTIMATELY, and in a strictly logical sense, all therapeutic means are natural, since outside of nature there is nothing. But the expression, "Natural Therapeutics," "Physiological Therapeutics," by common consent has come to mean those measures that involve the forces, influences and manifestations of Nature, as it were, at first hand, as opposed to the technically artificial resources of the chemist and pharmacist.

The trend of therapeutic investigation and experimentation for the past half century has been decidedly in the direction of natural therapeutics, and the past decade has been productive of more progress in practical results in this field than any similar period in the world's history.

The medical historian of the year 2000, sitting down to write a retrospective review of the current century, will no doubt call attention to this as the initial period of phenomenal activity in the matter of analyzing, adapting and utilizing physiologic measures and mechanical forces for medical and surgical purposes.

A generation ago, the publication of *A System of Physiologic Therapeutics,* comprised in a series of a dozen sumptuously printed volumes, edited by one of the foremost practitioners and clinicians of the age and prepared by men of professional preeminence, would have been considered *prima facie* evidence of a crackbrained editor and a foolhardy publisher. It would have added one more bulky item to the many examples of dead stock on the bookseller's shelves. Today, this work is a successful accomplishment.

Yet all these advances are strictly in line with other scientific and evolutionary changes, developments and readjustments of thought and theory regarding the origin of force and matter and of their countless combinations and reactions.

Pursuing this thought, nothing could be more natural or rational than to employ some natural force as a corrective and stimulant of disordered organic function.

I have no violent bolshevistic medical propaganda to scatter, nor any manner of quarrel with surgery or any other established procedure, but I wish to try and put across to you one or two thoughts pertaining to certain relationships and methods of utilizing electrotherapy in one phase—clinical medicine—and the possibility of a more effective use.

For some years past there has been much rather vague, but generally accepted, teaching and speculation as to the nature of the important, if not wholly controlling, influence of what have been termed by histologists "trophic centers." To those centers have been ascribed various vital denominations, especially in the control of body temperature. Progress has also been made in the construction of a system of localization of all of the

*Read at the Third Annual Meeting of the American College of Radiology and Physiotherapy, Chicago, Nov. 12, 1924.

vital functions, including nutrition, elimination and all forms of tissue metabolism. Corresponding with this, it is quite in vogue to ascribe the various psychic manifestations and disturbances to more or less accurately located cerebral centers.

It is but a step to this newer claim that all of the organs of the body, including every viscus, the blood vessels, the lymphatics, the absorbing and eliminating surfaces, the ductless glands and the reproductive system, are nourished, energized and inhibited, regulated and denominated, each and severally, by distinct ganglia. One enthusiastic specialist, who has given a lifetime of particular attention to the pelvis and its contents, discourses seriously and plausibly of the "Abdominal Brain."

Without going so far, but basing one's conception on generally accepted data, the pathologist of the day is not compelled to tax his credulity or imagination to reach the inference that any measure, application or influence that can be utilized to increase or diminish the blood supply and nutrition of an organ or tissue, can be influenced so as to profoundly affect its physiological as well as its pathological status.

To mention electricity as such an agent is simply to state an axiom, and to suggest its employment as an efficient modality, is to predispose a fair understanding of its physical characteristics.

This is not the time nor place to exhibit argument as to source of supply, make of instruments, or as to whether cotton or clay should be used as an indifferent electrode; but we are much concerned with any means which will help us toward a positive correction of a diseased process, and its selection must be left to the earnest, conscientious student who is so interested.

PHYSIOLOGICAL PROPERTIES

To appreciate these characteristics, then, mention of a few principles will not be amiss, and as the subject in hand relates more to the use of the continuous current, I wish to recall to your minds some of its physiological effects.

The first definite knowledge of the effect of galvanism on animal tissue dates back over one hundred years, and during that time some physicians have always been interested in the treatment of disease by electricity. No sudden or sensational change has been made in the conception of its physiologic effects. The physiological effects of electrical stimulation may be summed up briefly as follows:

1. It excites sensation at one time and contraction at another, according to the direction in which it traverses a nerve.
2. It does not excite a nerve when passing through it transversely.
3. Neither contraction nor sensation is produced when its influence is prolonged.
4. It alone has the property of increasing or diminishing the excitability of a nerve.
5. It has the power of awakening the excitability of a nerve after all other agencies have ceased to act.
6. When a galvanic current is sent through a tissue in the opposite direction to the nerve current, a muscular contraction takes place.
7. When the electrical current passes in the same direction of nerve current, a stronger contraction takes place.

These considerations cause us to be mindful also of the phenomena of electrotonos, electrolysis and cataphoresis or electroendosmosis, or electrochemic action.

CLASSIFICATION

All of these properties should be borne in mind in electrogynecology or the electrical treatment of the pelvic diseases of women. For the purposes of this paper, these diseases can be hastily classified into (1) those of faulty development, (2) those of psychic or neurotic origin, and (3) those of inflammatory origin, whether infectious or tramatic.

Inflammation is considered to embrace pathological conditions which are caused by the action of pathogenic microbes or their ptomaines upon the histological elements of the blood and the fixed tissue cells.

It is the function of the physiotherapist to orient the diseased condition and the modality offered. This is accomplished by various laws, particularly Ohm's law, the laws of contraction and reaction of degeneration.

Certain terms are applied to the galvanic current to distinguish the method of its application. Their names define them: stabile current, labile current, descending and ascending currents, increasing and decreasing currents, general and local galvanization.

With a diagram of the methods and laws governing these different currents and with an accurate diagnosis and only a reasonable belief in the efficacy of the modality, the operator can hardly fail to realize the applicability of electricity to pelvic diseases of women.

In looking over case reports dating back a score of years, one becomes enthusiastic concerning this form of treatment, and were it as remunerative as some other procedures, it would be much more in vogue and become a recognized specialty.

TREATMENT

Those pelvic diseases most often treated are: amenorrhoea, when this is not due to cold, fright, or when not due to anemia, nephritis, tuberculosis, etc. When due to an infantile uterus, this can be nicely treated per rectum in young women.

Dysmenorrhoea—Only two forms are accepted for this form of treatment, the obstructive and membranous. Occasionally the dysmenorrhoea of neurotic origin yields to electrotherapy, as well as any other method.

Cervical Endometritis, when acute, is treated in a grandmotherly fashion, but when chronic is always accepted, for the results are very satisfactory.

Corporal Endometritis. There should not be much confusion regarding this form of inflammation. It is sometimes hard to diagnose, but the results obtained by electrotherapy for this condition are little short of marelous. A cure may be reasonably expected.

Menorrhagia and *Metrorrhagia*, when due to lack of uterine tone, can be cured; but when due to retained placentae, or some forms of neoplasm, other methods must be employed.

Subinvolution can be effectively treated. If the case is presented many months after parturition, caution, treatment and patience must be exercised or superinvolution may follow.

Hyperplasia of the uterus or *Sclerosis*, with an increase of connective tissue, is a further sequel of endometritis. While electricity is the treatment of choice as far as local measures are concerned, it has been somewhat of a disappointment in our hands.

Polyps are simply and successfully treated, but *Fibroids*, although they sometimes yield to electrotherapy, are usually left to other measures, especially if they be subperitoneal.

Prolapses, *Versions* and *Flexions* should always be subjected to electrotherapy, for so often the organ can be retained as the personal property of the woman.

The *Peri-uterine Inflammations* have yielded nicely to our therapy and we treat them often. This is contrary to the generally accepted principle that "electricity is contraindicated in acute inflammations of any kind," but end results justify the means, and it matters not whether it be a cellulitis or a chronic peritonitis.

Ovarian Irritation will probably be best treated by the static current, especially in young women; but chronic inflammation of the ovaries gives us a definite field, since the pathology is more definite. Here electricity, if employed, will surely bring a return of the patient and possibly a friend with her.

In *Pyosalpinx* results are variable. Just why we do not know, so we treat cautiously and expectantly.

Abortions are performed so frequently because of hyperemesis that a plea is made to try applications of electricity first, for results are occasionally surprising.

CASE REPORTS

The case reports which I will offer you will be but few in number and are simply examples of the results which can be obtained when treatment is followed up religiously.

CASE NO. 1: Mrs. A. K., age twenty-two, reported Jan. 25, 1910, and gave a history of considerable trouble during her 'teens. She has one child who is now two years of age. She has many frequent pains in the right side. Her family history is good, and constitutionally she was in good condition. On examination, we found a severe retroversion, with considerable prolapsus of the right ovary and tube. The tube was very large and rigid, and a diagnosis of a tuberculous tube was made and treatments were followed up religiously until the following June. Then there was a three months lapse in treatments, until another treatment was given in September and one in October. Now, this was in 1910, and on a report recorded Jan. 28, 1920, she says that she is in perfect health, has no pain, has borne two children since and her pelvic condition is perfect. It would seem that a ten year period of perfect health would justify attacking these problems with electrical treatments.

CASE NO. 2: Mrs. D. H., reported Sept. 23, 1901. She was thirty-eight years of age, a housewife with three children. She complains of pain in the left side, extending through hip. A diagnosis of sciatica had been made and sciatic treatment had been administered by some cult. On making a local examination, I found an endometritis in rather severe form, a friable cervix, which would bleed at the slightest touch. I was afraid of

carcinoma, but at least thought that I would try metallic cataphoresis. This was given, and the endometrium was treated later. I heard from this patient in 1920, which was nineteen years after treatment was instituted, and she reported that her health had always been perfect since the last treatment.

CASE NO. 3: Mrs. C. G., aged sixty years, reported to me in March, 1902, complaining of some stomach trouble and uterine prolapse. Her general condition was very bad, for she had born nine children in rapid succession and complained of being in poor health all of her married life. On examination, I discovered a subinvoluted uterus with a prolapse of the bladder and rectum. This was one of those cases which no one really cares for, but as they seemed to be serious minded people, and agreed to give me two years time, I went to work and began first with vaginal treatments, using copper sulphate on cotton packs. This was followed with uterine galvanism and faradism. She was discharged in good condition in February, 1903. I also received a report from her in 1920 that she was still in good condition and had had no return of the pelvic ailment.

CASE NO. 4: Mrs. C. A. S., aged thirty years, reported Aug. 5, 1921. She had had three children, two miscarriages, had lost 30 pounds in weight and was still losing. Patient had severe bleeding, which simulated hemorrhages and lasted for twelve days. She subsequently suffered a great deal of pain for six or seven days, when the bleeding began again. This case was diagnosed as one of pulmonary tuberculosis, before coming to me, but I had a hunch that her debility was due to the loss of blood. I gave her a few careful x ray gastro-intestinal examinations, also x ray examination of the chest and confirmed my suspicions that her trouble was pelvic. I found a large, boggy uterus, and after treating for three months she was discharged, having gained 25 pounds in weight and demonstrated no cough or night sweats. At the present time she considers herself in perfect health.

CASE NO. 5: Miss C. S., aged twenty-three, student, complained of pain in her right side. Her appendix had been removed two years ago, but no relief had been obtained from the pelvic pains. She reports considerable pain at each period, so much so that hot foot packs, hot toddies and sometimes morphine is necessary for relief. I diagnosed this case as one of infantile uterus, and after using galvanism for two months, twice weekly, then weekly for another month, the case was discharged as cured. She reported in last October that she has been perfectly well and healthy all summer and has no pain at her periods.

CASE NO. 6: Miss M. M., aged twenty-two years, reported to me April 27, 1914. She had mumps at sixteen, with possible pelvic complications. Since that time she has not menstruated. This occurred somewhat over five years ago. The family became worried about her mental condition, and brought her to me with the above history. The young lady was five feet seven inches tall, weighed 140 pounds, did not answer questions and seemed listless as to proceedings. On making an examination, I found an infantile uterus, but could not detect the ovaries at all. I believed that they were sclerotic. The mother, having been an old patient of mine, they agreed to turn the girl over to me for two years and, after continuous treatment for fourteen months, the girl began to menstruate and has continued to do so in a regular manner. A report taken last September says that she is still in good health.

CASE NO. 7: Mrs. I. M. A., aged forty-two, has had no children and one miscarriage. She reported on Feb. 1, 1921. She had been sick for fourteen years. She was operated on for appendicitis ten years ago, and has very scanty, irregular menses, with very severe cramping. Numerous clots are passed. She reports that she visited a large clinic in the northwest and after examination was told that nothing could be done to relieve her. On examination, I found a small, sclerotic uterus, but was unable to detect the ovaries. The position was good, but there was a very rigid pelvis. My diagnosis was general pelvic cellulitis. This case was treated with nothing but galvanism for two months. After a rest of two months, and another month of treatment twice weekly, she returned in good health, and a report from her this summer reads that she remains in first class health and both the wife and husband are very happy.

The above cases were taken at random from my files by my secretary. Unfortunately, none were postoperative, for in this class of cases results are very satisfactory.

DISCUSSION

Dr. G. B. Massey (Philadelphia): This is a very interesting subject to me, and has been since about 1884.

I have lived through the period of propaganda for the arrest of this general slaughter on the organs of women, and still see the need for our earnest endeavors to arrest its continuance.

What we want here in a society of the character indicated by the President and Presiding Officer this morning is the exact technique of treatment, following an accurate diagnosis. A clear statement of the technique is indicated.

One of the most necessary things to me is the impressing upon physicians, who are not strictly gynecologists, that their first duty here is that of asepsis and that their second duty is that of making a proper diagnosis insofar as the diagnosis can be made by manual touch without an exploratory incision. Some of the great operators in Philadelphia have argued on both sides of this question. Some tell me that a diagnosis cannot be made until their fingers are in the pelvis, entering through the abdominal wall, yet they also made the statement that you must make your diagnosis before you operate.

It is my opinion that a man should become sufficiently expert in bimanual diagnosis, helped by other means within his power *excepting operation*, to detect an abscess. Enclosed pus in the pelvis need not receive any electrical treatment. He should also discriminate and exclude by x ray uterine pregnancy.

On referring this case to the surgeon, I should beseech such surgeon not to open the abdomen if the tube is already ruptured and the patient is still alive, until sufficient time has elapsed between the rupture and the opening of the abdomen to facilitate absorption.

He should, of course, exclude ovarian cystomas; no good can come from any electrical treatments of cystomas.

We never pass a sound or exploratory instrument, particularly for electrical purposes, if there is a possibility of there being any inflammatory condition of the appendix.

Doctor Grote mentioned the treatment of a pus tube. One of our surgeons has confessed that many of his pus tube cases under operation reveal no pus except mucopus. By the vaginal-abdominal treatment the inflammation can be reduced and finally by a very gentle, tentative intra-uterine application, it is possible to drain that tube and restore that woman to her normal self.

I am not going to take much of your time, but I want to plead for the dropping of the term galvanism. It is not the first time I have made this request. It is a meaningless term, for it includes several things. If you are going to use a wave current, say so; if you are going to use a positive pole, say so.

Dr. W. F. English (Saginaw, Mich.): I would like to ask the Doctor as to the technique of treating infantile uterus, amenorrhea, etc.

Dr. H. W. Grote: I am very glad to have my thoughts accentuated. Of course, all the regular precautions are necessary and, of course, it is much more necessary to make a diagnosis before treatment with the electric current than it is before operation. I have done both.

Of course, we know that anything containing a wall, such as a cyst or an intra-uterine pregnancy, will not respond to the electric current.

In reply to Doctor English's question, it is very hard for me to give a cut and dried technique. I did my first work in the pelvis in 1898. At this time I worked out a technique that I applied to every case that came in and I failed in more cases than I benefitted. For a period of probably seven or eight years, up until five years ago, I did not do very much of this work. Five years ago I resumed my electrical therapy, varying my technique to suit each individual case. I am now selecting my cases and am gratified with the results obtained.

To illustrate, let me consider more specifically the young lady that I spoke of in the case record with the infantile uterus, which never had an intra-uterine electrode. I treated that with the iron ball electrode covered with chamois skin, placed posteriorly to the cervix (the uterus was in fair position), with a large abdominal indefinite electrode. I began that case with daily treatments, lasting five minutes and giving only three milliamperes of current. In about two weeks time I increased the strength of the current. I was very dubious over this case because it was a question of whether we had some dementia or not, but upon increasing the current, she responded nicely. The current was increased up until 40 milliamperes at about the eighth or ninth month of treatment. I became a little disheartened and didn't care much what I did,

plexus and the negative pad over the abdomen. but kept at it every week. As I say, before treatment it was five years since she menstruated. She has menstruated regularly ever since and she is perfectly normal mentally and enjoys the society of young people. She has taken up and completed the requisite work in the State Normal, and today has charge of 31 teachers in Cook County.

In cases of amenorrhea, I get my best results in the majority of cases by simple galvanism, the positive pad over the sacral nerve

Some End Results Following Physiotherapy*

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AN end result is a condition, a state, or a complex arising out of the effects created by all influences under which it has passed. These influences may be controlled and directed influences, or they may be entirely without supervision and intent. In such instances, it is readily seen that effects resulting may be for good, or for bad end results. Or again, many influences registering effects may be of uncontrollable nature, of natural, physical and chemical origin, the regulation or modification of which is limited or well nigh impossible, making for, at best, with all intentional and directed control influences exerted, a mixed and mediocre effect. Likewise, just at which time a result has reached the end, a time when all influences cease to produce effects, is a matter perhaps beyond the judgment of the human mind. Perhaps as long as a condition exists, influences passing do register effects and have tendencies to leave behind definite reactions to their exertions.

In medicine, however, end results are considered as conditions of anatomy and physiology restored to the best degree of function permitted under the pathology present. This degree, perhaps, is never a 100 per cent restoration, but very often the percentage approaches the normal so as to simulate that state so closely as to defy any noticeable deviation. This is the end result the true physician seeks, and in seeking, reaches the best that is possible to obtain with that with which he has to contend.

In the present series of cases presented, a normal has been the end sought, but in many instances uncontrollable circumstances have intervened to prevent this desire. While the subject title indicates that physiotherapy has played an important part in influencing the disease processes treated, it is to be distinctly understood that wherever other means of therapy have been indicated, no hesitancy has been felt to add them to the treatment.

The writer believes that all treatment is fundamentally based on accurate and correct diagnosis and should never be seriously instituted until such time as all methods of precision have been exhausted to that end. With a proper diagnosis established, indications for treatment are presented, and the best means available can be selected, and if the indications, as embraced by the different therapy methods are correctly understood, the application of proper therapy becomes a matter only of institution and supervision.

Surgery and internal medicine undeniably reach end results in a large percentage and variety of cases in such a decisive manner that nothing further is desired or could be added as complimentary to increase the brilliancy obtained. But it is likewise a fact that many types of pathology today are amenable to these two branches only up to a degree that is unsatisfactory to both the physician and patient. It is here, in these patients with pathology of types mentioned, that physiotherapy has a very definite field of usefulness. And, parenthetically, it is this type at this inactive stage of progress that patients have drifted away from legitimate hands into channels of unschooled and improperly trained "pathies" and "isms."

Bernay has very aptly written: "Science abhors authority; it requires demonstration of facts; it believes nothing upon anyone's authority." With this dictum in mind, as a stimulus and a desire to place the use of physiotherapy into hands in which it rightfully belongs, the present attempt at demonstration has been undertaken. In an endeavor to con-

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vey pathological states that are responsible for impaired physiology to the vision through stereopticon means, there are many impediments encountered. Many pathological lesions are unfit for photographic and slide demonstrations, while still the lesions in themselves are means of diagnosis readily discernible. X ray films that show plainly enough to the roentgenologist exaggerate deviations from the normal, are offtimes poorest material for transference to positive plates. But in spite of these obstacles, the presentation is given with the one idea of showing you by check-up methods just what has been accomplished in some diseased conditions by the use of physiotherapy.

What has been done with cases demonstrated here has known applications many times in the routine of treatment, and can, if followed faithfully, be reproduced in the hands of any well trained men. There is no mystery surrounding the use of physiotherapy modalities. Proper diagnosis, a proper understanding of the various physiological changes that are induced in living tissue, and definite indications present that are unamenable to these changes are all that are required, together with the correct knowledge of application. I am assuming that these essentials need not be here elaborated, but shall only record what has been done and show the results obtained.

In making selections of cases presented, variety rather than numbers has been the predominate determining factor. This, because the use of the modalities inspecific types of pathology seems to be more urgently desired, rather than a large number of cases supporting the use of one modality in one particular pathological lesion. The future will hold opportunities sufficient to elaborate on case type if desirable.

In using the ultra violet energy for a curative agent in psoriasis, I am not unmindful that the disease in its natural course of resolution assumes an active and inactive stage and that many therapies, applied during the later period, have been heralded as influencing the disease for good, when in reality spontaneous improvement was perhaps alone responsible. Actinic energy, however, has in such a large percentage of cases and in all seasons of the year, in both sexes, and at all ages, given such uniformly constant results that its indication has rightfully gained an honored place along with other therapeutic measures in the treatment of this chronic, recurring skin condition. The ultra violet is not here advocated as a specific for psoriasis, but it is maintained to be less harmful, cleaner, more easy of application and more efficient, together with some drugs and diet, than the x ray and a host of unwielding ointments. Periodicity is lengthened, interval of freedom is greater, general distribution is lessened and itching is minimized and in some cases completely controlled.

Oak poisoning, ivy poisoning, in fact, all the poisons comprising the dermatitis venenata group, are amenable to and have been favorably effected by ultra violet energy. Many times cases are presented only after all other means have not given relief. These are difficult to influence, as in most pathological lesions the earlier the treatment applied the greater the possibility for a favorable effect. However, persistency has in most cases been productive of good.

The case of eczema is shown only to emphasize a failure. This particular case embraces an endocrine problem which involves several glands, predominately the thyroid. Glandular medication administered, served to clear up the condition insofar as the mental sluggishness, slowness in the development of the bones, eruption of teeth, locomotion, etc., was concerned, but to the skin it added nothing. Protein sensitization was suspected and proper diet instituted, but to no avail. Three months under actinic rays brought forth intervals of relief and parental hopes, but always followed by relapses and no permanent good. It is not to be understood from this, however, that all eczematous lesions are effected unfavorably by the actinic ray. This is far from fact. Many cases clear up as if by magic.

The case reported as endarteritis obliterans is called so only for a want of more certain diagnosis. The condition has puzzled many and has been called dermatitis exfoliatum, Raynaud's disease, erythema multiforme and many other things by a large number of the profession whom the patient has consulted for relief. The lesion is in a man, forty years of age, previously and at the time of beginning, fifteen years ago, a stationary engineer; involves the hands and feet and presents a thickened, chronic induration with exfoliation of the skin, leaving behind a very thin and sometimes fissured skin. Suspected freezing is the only etiological factor of note. Deficient thyroid activity was suspected, but repeated metabolic tests, with indication of normal activity, made this view untenable.

Joint pathology offers indications in abundance for application of physiotherapy modalities. Synovitis and arthritis, whether of traumatic or local, general or infective etiology, respond surprisingly to diathermy, the local pain and distress disappearing and permitting rest and sleep in but few treatments. In the local or traumatic type, a permanent relief is expected, while the joint expression of a focal infection or general systemic condition is symptomatically treated until the focus can be eradicated and a definite cure effected. Very often the attending swelling is reduced without aspiration, but where this is not so the latter procedure must be performed.

Open fractures, with or without accompanying osteomyelitis and drainage through sinuses, have never before been aided to a greater degree than that added by the use of conversive heat. A small series will be presented and in these not alone is that infection materially affected, but the increased deposition of calcium has influenced the calus formation to a point of union, permitting greater ease of handling and greater security without fear of dislodging fragments. And it is noteworthy the time required is much less than without diathermy application. In other words, these patients are out of bed much sooner and hospitalization and convalescence materially reduced. In industrial surgery this phase has a definite economic consideration.

The two esophageal carcinomata demonstrated serve to illustrate that this type of cancer is not entirely without some definite aid. The comfort of the patient is greatly increased. Death is due, in cases where amelioration from radium or x ray, or both, has not been obtained, to the presence of the disease and not as usual to starvation mechanically induced. In both these instances a negative galvanism is the choice of treatment, delivered through specially constructed esophageal electrodes. This mode of treatment is more successfully applied in nonmalignant obstructions.

By far the most interesting, even to a point of hobby, is the small series of constipation and ptosis cases presented. Not since Lane's epochal writings on the colon and its various vagaries, has there appeared in this connection any offering as profound and possibly far reaching as the application of the sinusoidal current for a curative influencing effect. And this is the more astounding, because it fills a gap in treatment admittedly hopeless with other means. The day of the old dictum, wherein a patient was directed to wear an abdominal belt, exercise the abdominal muscles and eat to gain weight in hope of tightening ligaments, has passed and is relegated to the scrap heap of old, inefficient things, not much good at its best. Real surgeons hesitated to apply their art here because, not of difficulty, but for poor end results. The proper application of the sinusoidal currents fulfills every requirement demanded. Abdominal muscles are accurately exercised. The muscles of the colon are contracted, the ligaments are shortened, all require increased tone, more strength and greater muscular propelling power and oftentimes the ptosis is lifted, the bowel rescued from further relexation and motive power of the colon restored. With all the attending symptoms and horror of auto-intoxication banished, the patient returns to a normal, active, productive life. A visual demonstration of this action is very easy of access, providing the interest therein impels it. A barium enema, fluoroscoped after injection into the colon while the sinusoidal current is applied and operated, produces before your eyes that which is here maintained.

CONCLUSIONS

It is not the purpose of the writer to advocate the replacement of known, proven, accepted and satisfactory medical and surgical treatment by means of physiotherapy methods—the tradition of the ages and the forward march in the advancement of scientific research symbolize that which is held by him too sacredly to permit of such levity, but that which he would do is to plead with those holding the same ideals not to discard as useless and unworthy a means of therapy untried, but rather to seek and to investigate with that same scientific eagerness for truth and application precision that bespeaks the same zeal in field of other endeavors.

Treatment of Malignancies by the Use of Surgical Diathermy and X Ray*

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AS indicated by the title, the material in this paper will be classified and discussed under two general headings (1) Surgical Diathermy, and (2) Roentgenotherapy. Serious consideration of their applicability in the treatment of malignancies is desired.

SURGICAL DIATHERMY

Electrocoagulation may be defined as the coagulation of diseased tissues by the use of the Oudin or the d'Arsonval current and is employed most frequently in the destruction of small, superficial lesions.

Surgical diathermy is the application of the high frequency currents for the destruction of tissues by the heat produced through the resistance offered by the tissues through which the current is forced, without sparking. The treatment differs from the application of electrocautery or other applications of heat in that the heat with the latter methods is applied from without and does not have much penetrating power. The heat is generated in the tissues themselves and the temperature of the diseased area may be readily raised to a point of coagulation. Therefore, it is the penetrating power of this heat which is more beneficial than the thermic cautery, which destroys only by transmitted heat.

Surgical diathermy is produced by the bipolar method of the d'Arsonval current and should be of low voltage, high amperage and of extremely high frequency. The indifferent electrode is a piece of block tin about eight inches in diameter and is strapped to the patient's back or shoulders. This electrode may be wet with a soap lather or used dry. The main object is good contact, and strapping with a good canvas binder is all that is needed. The active electrode is smaller and either made up of a point or some other suitable electrode, as to the shape and size needed.

In surgical diathermy or electrocoagulation it is necessary to use some anesthetic. For the superficial lesions which are not large a local anesthetic as novocain or some similar preparation is satisfactory. For the larger ones we use hyoscine and morphine and find H-M-C satisfactory. The ¼ grain morphine size is given about forty to sixty minutes before starting, then one-half or another full dose is given upon starting, with sufficient chloroform to produce good narcosis. Ether is not satisfactory on account of the danger of explosion, especially when working about the face.

There is very little postoperative shock to surgical diathermy, and on this account it is especially valuable in the aged. My oldest surgical diathermy patient, who was ninety-four years of age, had a large cancer of the lip and was ordered to remain in the hospital for several days. The entire lower lip and part of the upper was removed by this method and the next morning he was sitting in front of the hospital in his Ford car when I arrived at 9 a. m. and was wondering why the doctor did not get around sooner. There is a wonderful alleviation of pain, and this is almost immediate after recovering from the anesthetic.

The local application of sufficient heat to the tumor destroys the growth. The use of a lower degree of heat to the periphery of the tumor and beyond its limits results in the inhibition of the growth of the migrating tumor cells. The dissemination of these cells throughout the organism is further prevented by the occlusion of the lymph spaces and channels, and further by the formation of scar tissue, which forms a most desirable barrier against the new growth. By diathermy, the deep penetration of the high degree of heat destroys or at least inhibits instead of stimulates, the neoplastic cells in the zone just beyond the periphery of the tumor mass. Surgical implantation of the tumor cells into healthy tissue is the unavoidable as a result of excision and dissemination of metastases by the opening of lymphatics and blood vessels. On the other hand, by surgical diathermy the lymphatics and blood vessels are closed and metastases are not produced. By this method there is no possibility of transplanting or implanting cancer cells into new tissue. There is less likelihood of recurrences by diathermy. The dosage is accurate and, owing to the extreme

*Read at the X Ray, Radium and Physiotherapy meeting, Omaha, Nov. 5, 1924.

heat, there is absolute sterilization of the wound.

There is less tissue sacrificed than by surgery and ordinarily good cosmetic results are obtained. If necessary to remove very large areas, it may be necessary to do some plastic operation, especially if on the lower lip.

If it were possible to destroy a tumor mass by ordinary cautery, there would be some danger of the burn producing a systemic poisoning; but there is no absorption from the burned area in coagulation on account of the sealed blood and lymph vessels.

The postoperative condition leads to a quick recovery and during this period the unpleasant odor is one of the disadvantages to this method of treatment. Another disadvantage of electrocoagulation is there being no chance of saving blood vessels and nerves in close proximity to the disease.

Any fissure or crust which lasts longer than a month should lead to the suspicion of malignancy and during this period the general practitioner has a great responsibility.

Practically all cancers of the skin can be successfully treated by means of x rays and electrocoagulation, provided they are treated early and skilfully. Precancerous conditions in the skin, warts, moles, etc., are best treated by coagulation. Early local destruction of all malignancies by surgical diathermy and followed by high voltage x ray therapy of the local lesion and the draining lymphatic areas should cure all such cases. The combined treatment of surgical diathermy and x ray therapy offers a better promise of a permanent cure than either alone. Poor technique with any form of treatment will usually lead to failure and recurrent carcinoma gives much less satisfactory results. It has been my practice when possible to radiate the area involved both before and after the surgical diathermy treatment and to also give another x ray treatment after complete healing has taken place.

No tissue should be removed before treatment for diagnosis. I would rather have a lesion of long standing cured than to know the pathology and die from cancer.

ROENTGENOTHERAPY

Ever since radiation was first recognized for the treatment of cancer the surgeon has referred to the radiologist the worst wrecks wrought by this dreaded disease. For years this effort on the part of the radiologist to check the ravages of the inoperable case has assisted in keeping into the background the real value of this mode of treatment. Nevertheless, something had to be done for the suffering patient, and the radiologist, even though failure seemed the rule, continued to make improvements in technique and, with the aid of the manufacturers of apparatus and physicists, there has been a great advance in the treatment of malignancies. As a result, radiology has made more advance than any branch of medicine during the last twenty years.

When the inoperable case appears before us and the patient is beyond the aid of any modern treatment, and, when we realize there was a time in the beginning of this dreaded condition that satisfactory treatment would have prevented his terrible condition, we feel that the general practitioner and the patient himself carry the greatest responsibility in obtaining or directing the right kind of treatment to cure the lesion. The fact that the surgeon and radiologist has continued to give treatment to the apparently hopeless case has not only been a stimulus for more advancement, but, on the other hand, has driven from us many cases in their infancy who could have been cured, but drifted hopeless along, waiting until too late or finding their way into the hands of incompetent aid.

Too often the average physician will pass up the small, beginning lesion, which is easily removed, with a remark to the patient which leads him to think it is of no importance and can be ignored with perfect safety.

This was seriously brought to my attention by the following sad experience: A painter, working in our office many years ago, consulted me in regard to a very small epithelioma on the side of his face. This was only the size of a small pea and readily curable. Like many other patients who are told they have a beginning cancer, he went to another physician for consultation. This physician advised him as follows: "Let that small thing alone or it will become a cancer." This seemed to suit him the best, and he abided by the same for some months, when one day I met him on the street with a plaster on his cheek with a sore beneath about one inch in diameter. He said he had been away to a cancer specialist, who was going to cure him very rapidly with a cancer paste. I frequently met this man, and noted his dressing was gradually increasing in size, and he remained under the so-called

"specialist's" treatment for several months. When he finally had to call for home treatment there was only one resort and that was plenty of morphine, and this I willingly furnished, as the condition was terrible. The entire side of his head, face and neck was involved in one large ulcerating cancer mass. The responsibility of failure in this case mainly stood with the physician who gave him the wrong advice when the small growth was curable and no doubt turned the patient to the cancer quack by his statement, which put a question of doubt in his mind as to the ability and honesty of medical advice.

On the other hand, I would cite the following case showing the absolute responsibility of the patient: Mr. F. one year ago had a black mole on the side of his forehead, which he permitted a neighbor and layman to tie a thread around to choke the circulation. The growth came off in due time and healed, remaining in good condition. But in less than thirty days he had a metastases in the cervical region of the neck. This was removed twice by his physician by surgical means, with immediate return. He then went to Savannah, Mo., for caustic treatment and this also made matters worse. Three weeks ago I was consulted. There is seen an extensive recurrence in the neck, this being quite deep, and many large lymphatic glands are palpable. The location precludes diathermy treatment unless the deep vessels of the neck were ligated, and then important nerves would be probably sacrificed. He also has a metastases on the abdomen, which we removed by surgical diathermy. The only treatment given was over the side of face, neck and shoulder, using massive, high voltage x ray. The voltage used was 210,000 volts and there appears to be a distinct improvement, but the time is too short to note what permanent improvement will result.

These two cases are mentioned to show the responsibility of the general practitioner and the patient. In the first case, as mentioned, the physician gave wrong advice; and in the latter, the patient failed in permitting a thread to be tied around a black mole, which immediately promoted a serious and probably fatal metastases. Now, what is the solution for this problem? These are only daily happenings and we must meet them. It seems to me that a banding together of the radiologists and physiotherapists over the country in good, strong organizations, which meet on certain stated occasions and regularly, with strong and useful discourses, will not only promote cooperation and good feeling among us, but will give us recognition among brother specialists. We will also in this manner be a great factor in the education of the general practitioner as to the manner of safely handling this type of case. As to the education of the public and the future cancer patient, these organizations and their workers can assist in an ethical manner to enlighten the public during our national cancer week by public discourses on cancer and also to give information to the lay press and use their influence to spread the gospel of early and satisfactory treatment.

Skin Reactions to Simultaneous Treatments With Radiant Heat and Soft X Rays*

JAMES A. HAWKINS, Ph.D., and
HARRY CLARK, Ph.D.
(From the Laboratories of the Rockefeller Institute for Medical Research.)

IN the course of experiments in which guinea pigs were exposed to x rays it was observed in several instances by one of us (Hawkins) that whereas a given exposure to the rays, filtered through very thin cardboard, produced no visible effect on the skin even after several days, the same exposure to unfiltered rays in otherwise similar circumstances was followed a few hours later by the appearance of a burn. The difference in intensity of the x radiations, filtered and unfiltered, amounting to 3 or 4 per cent of the ionizing power in air, can scarcely account for such widely different effects. The nature of the burns and the promptness with which they appeared suggested that they might have been caused in part at least by radiant heat from the tube. That healing did not occur promptly and properly indicated.

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however, that there had been some aggravation by the x rays. In order to determine whether or not the combined action of x rays and radiant heat has a more profound effect than either agent alone we have made some experiments on guinea pigs in circumstances such that the two kinds of radiation could be administered separately or together.

METHOD

The x rays were supplied by an outfit previously described, the output of which is known to be constant in quality and intensity. The tube and the animal occupied two separate compartments of a lead-lined cabinet, the rays passing through an aperture covered with a filter of thin bristol board. The compartment containing the tube was sufficiently ventilated by means of a fan to keep the filter and other parts of the partition cool, thus preventing the heat of the tube from reaching the animal. The tube was operated in all cases at 30 kilovolts and 22 milliamperes.

Radiant heat was supplied in some cases by electrically heated coils of nichrome wire and in others by an electric soldering copper. The source of heat was placed about 3 cm. above the abdomen of the animal, close to, but not actually in, the path of the x rays. The position relative to the skin area to be exposed, and to the cabinet, was carefully maintained throughout each series of experiments. No attempt was made to measure the rise in temperature of the skin; the conditions of heating were carefully reproduced, however. The copper, when used, was pre-heated for the same length of time in every case, and both copper and coils were operated at constant voltage. All exposures were begun with the cabinet at room temperature and the cabinet doors were kept closed during the experiments to insure constant air current conditions. The fact that each exposure of heat, in the following experiments, lasted one minute longer than the corresponding x ray exposure was necessary on account of the technique of handling the x ray apparatus. Before each experiment the intensity of the heat was adjusted on the basis of a few preliminary trials to the critical value for producing little or no burn.

The technique of holding the animals in place and at a definite target distance has been described. The abdomen was shaved before treatment and covered with lead-filled rubber except for the area, 7 by 5 cm., to be exposed. For further protection from the heat and roentgen radiations a lead sheet with a hole corresponding to the one in the lead rubber was placed over the whole animal.

EXPERIMENTS

Experiment 1—An area on the abdomen of each of six guinea pigs was exposed for 11 minutes to the heat from a nichrome coil held

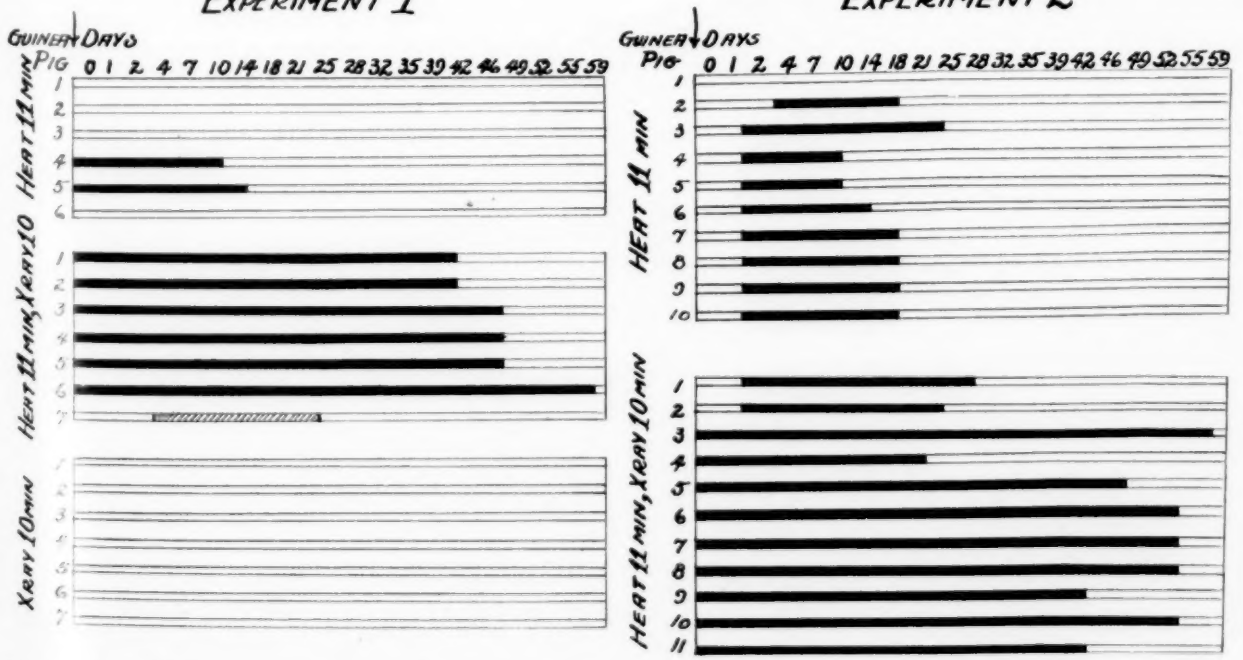
EXPERIMENT 1
GUINEA PIG
DAYS
0 1 2 4 7 10 14 18 21 25 28 32 35 39 42 46 49 52 55 59
HEAT 11 MIN
HEAT 11 MIN, X RAY 10
X RAY 10 MIN
EXPERIMENT 2
GUINEA PIG
DAYS
0 1 2 4 7 10 14 18 21 25 28 32 35 39 42 46 49 52 55 59
HEAT 11 MIN
HEAT 11 MIN, X RAY 10 MIN

Chart 1—Each line represents the history of a single individual animal from the time of exposure till the end of the experiment. The heavy lines indicate burns; the cross-hatch, scaling but otherwise intact skin, and the shaded line indicates no reaction, or a healed lesion in the skin.

Chart 2—See explanation of Chart 1.

about 3 cm. above the surface of the skin. A second series of seven pigs received a combined exposure to x ray and heat, the duration of the exposures being ten and eleven minutes, respectively. A third group of seven animals received a ten minute exposure to x ray alone. The target distance for the x ray exposure in both of these groups was 35.4 cm., which gives, with the other factors, about 90 per cent of the estimated critical dose for producing slight scaling of the skin. For the control exposures of heat and x ray alone the two agents were administered separately under conditions identical with those obtaining when given together.

Among the animals exposed to heat alone two of the six pigs developed burns which appeared immediately after the treatment but were healed completely between the 10th and 14th days. Of the seven animals receiving the combined x ray and heat six developed extensive burns which did not heal completely till between the 42nd and 59th days after treatment. None of the animals exposed to x ray alone showed visible skin changes (Chart 1).

Experiment 2—An area on the abdomen of each of ten guinea pigs was exposed for eleven minutes to the heat from an electric soldering copper held 3 cm. from the skin. Another lot of eleven animals were exposed in a similar fashion to heat for eleven minutes and x ray for ten minutes, the exposures being made simultaneously. As the x ray dosage used for this experiment was the same as that of Experiment 1, no control was included for the effect of this agent alone.

All of the heated animals with two exceptions developed burns but these did not appear till twenty-four hours after exposure and were completely healed between the 10th and 23rd days. Among the eleven animals receiving the combined treatment all developed burns, which, with two exceptions, appeared immediately after exposure. The healing in this group was somewhat irregular. In three animals it was complete between the 21st and 28th days, but in the remaining eight not until between the 42nd and 59th days (Chart 2).

Experiment 3—The source of heat in this experiment was the same soldering copper as that used in Experiment 2, but the distance from the skin was increased to 4.5 cm. and the length of exposure to sixteen minutes. Of the five animals exposed to this dosage of heat only one developed a burn and this appeared the 2nd day and was healed by the 14th day after treatment. The other four guinea pigs all showed slight scaling but no break in the skin.

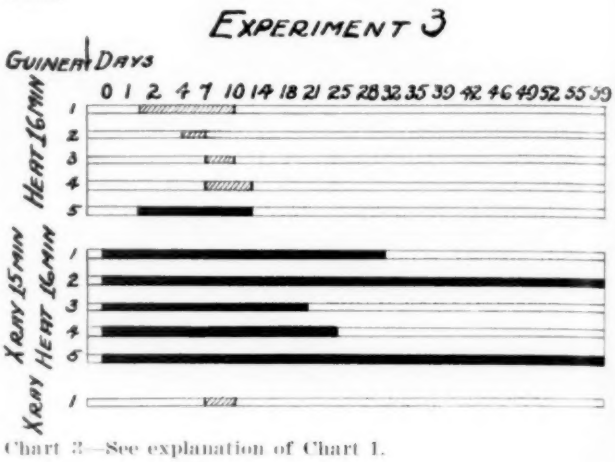

Chart 3.—See explanation of Chart 1.

There was a slight change also in the x ray dosage in this experiment, the target distance being increased to 36.7 cm. and the time to fifteen minutes. This dose was sufficient to cause some scaling. The combined treatment with the two agents produced burns in all of the five animals exposed. The lesions appeared the 1st day, but the healing showed some irregularity, the process being complete in one animal by the 21st day, in two others by the 28th and 32nd day, respectively, and in two only at the 59th day (Chart 3).

From these results it is seen that there is a marked difference between the developments in animals receiving either heat or x radiation alone, and those receiving both radiations simultaneously. The x rayed animals used as controls in Experiments 1 and 2 showed no skin reaction throughout the observed period, the hair growing in on the exposed area by the 14th day after treatment. In Experiment 3 the x ray dosage given was sufficient to produce slight scaling with no erythema. The animals which were exposed to heat radiation alone, exhibited slight burns in 50 per cent of the animals treated. The burn appeared as a small white thickened area on the 2nd or 3rd day after treatment, which broke down and ulcerated on the 4th or 5th day and healed completely between the 10th and 14th days after exposure, leaving practically no scar. The irregular results from the heat treatment were to be expected because many factors were involved and the estimated dose was close to that which would regularly produce a burn.

In the experiments in which the guinea pigs were exposed to heat and x radiations, simul-

taneously, all the animals developed well marked burns except one, which had persistent heavy scaling for two weeks. The skin of these animals showed small hemorrhagic spots in the exposed area immediately after treatment. One or two hours later a large edematous area had appeared, which broke down in two or three days. The lesions resulting were similar to those produced by heat radiation alone, but were much more extensive. They healed much more slowly, the majority taking from thirty-five to fifty days, and when healed left a thick scar.

DISCUSSION

No interpretation of the phenomenon is ventured. Whether one sort of radiation sensitizes the tissue to the action of the other can be learned only by giving the treatments in sequence. Experiments of this kind are now in process.

It is of interest to note that Rohdenburg and Prime[2], working with certain transplantable mouse and rat tumors, have found that the combined effects of a certain exposure to heat and x rays *in vitro* were lethal, although either exposure alone was without effect. A phenomenon somewhat similar perhaps has been observed by Bovie and Daland[3], who have shown that by an exposure to fluorite rays *Paramecium caudatum* is rendered extremely sensitive to heat, so that it is injured or killed by an amount of heat which would not affect a normal unradiated individual.

SUMMARY

Guinea pigs have been exposed to suberythema doses of soft x rays, to radiant heat of intensity about critical for producing slight burns, and to both radiations simultaneously. No erythema was produced in the skin of the animals exposed to x rays alone and only slight burns resulted in 50 per cent of the animals exposed to heat radiation alone. The animals exposed to heat and x radiation simultaneously developed well marked burns, which healed much more slowly than those produced by heat alone.

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CASE REPORTS

Mediastinal Empyema: A Case Report*

WILLIAM SHEPHERD, B. Sc., M. D.,
Rulo, Nebraska,
and
C. L. HUSTEAD, M. D.,
Falls City, Nebraska.

WHITE Male, W. W., age 36, bridge carpenter by trade, was taken ill on May 30, 1924, with a severe pain in the right chest. In the course of a week, he had developed a hacking cough which became productive, and in a short time he was expectorating about a pint of putrid sputum and losing weight very rapidly.

June 15, 1924, patient had a distinct pulmonary hemorrhage, about one-half cup.

On June 18th, 1924, patient had a moderate rise in temperature, from 100 to 102 degrees, with a white blood count of 24,000, a red blood count of 4,500,000 and hemoglobin of 75 per cent. Examination of the sputum showed many pus cells and numerous gram positive cocci. No tubercle bacilli could be found at any time. The physical findings of the chest at this time were wholly negative. Plate No. 781 "A" was taken and later submitted to Dr. A. F. Tyler of Omaha for interpretation. His interpretation follows:

> A large area of increased density appears in the region of the right root. Studying these films stereoscopically, I think I can detect a cavity inside of this area of increased density which leads me to feel that the patient had neither a mediastinal empyema or an infection of one of the peribronchial glands which had broken down, in either case rupturing into the bronchus and allowing the expectoration of pus to take place.

The patient was not seen until August 17th, when he appeared very thin and septic with

agonizing thoracic pain. There was a flat area in front of the right chest from about the fourth rib to liver dullness. In the back, there was a flat area between the seventh to ninth ribs. No whispered nor spoken voice could be detected over this area. Needling the back and axilla did not get into the cavity.

August 19th, 1924, film No. 917 was taken. When we saw him at this time, he had lost in weight, from 180 lbs. to 110 lbs. We drained the chest from the front, taking out the fourth and fifth ribs, and found a pleural pocket containing a pint of foul smelling sero-pus. After operation he developed a severe diarrhea lasting six weeks. The diarrhea subsided and the chest wound closed. He gradually gained weight up to 175 lbs. He, however, was expectorating a half-pint of muco-pus, not foul smelling, in twenty-four hours. Dr. A. F. Tyler's interpretation of this film follows:

An area of increased density involving the major portion of the lower two-thirds of the right chest is demonstrable, the increased density being in the neighborhood of the root. From the appearance of the film, I would think that pus had drained out into the greater pleural sac, probably finding its way into the greater sac by oozing out between the lobes, as confirmed by your operation and drainage.

August 21st, 1924, about six inches of the fourth and fifth ribs, right, were removed and an interlobular empyema in the anterior fissure revealed. Drainage tubes were inserted.

On August 23rd, 1924, the patient showed marked improvement.

The expectoration was still quite profuse on August 26th. Bismuth subnitrate was administered 20 grains four times daily. The bronchial fistula still admitted acriflavine which when injected into the wound was expectorated.

Patient became temperature free Sept. 4th, 1924. Examination revealed a large granulating wound with little drainage. A diarrhea developed which was rather severe—5 to 10 stools a day. Administration of Bismuth grains 20 and Salol grains 10, had little effect.

Sept. 9, 1924, Lactodextrine was given without effect on the diarrhea.

After allowing a liberal diet, Sept. 20, 1924, the diarrhea improved. Examination of the wound showed it almost closed.

October 1, 1924, patient weighed 148 lbs. Physical examination showed flatness of the lower right chest. There was still some expectoration, and although the ankles and feet were swollen there was no albuminuria. The patient was up and about.

November 1, 1924, the patient had gained in weight up to 160 lbs. His joints and hands were considerably swollen, and there was considerable cough.

January 1, 1924, he had increased his weight up to 175 lbs. A small sinus lead to the stump of the fourth rib.

January 23, 1925, another film was taken. The patient had persistent sinuses which apparently came from the stump of this fourth rib. Under a local anesthesia this stump was removed and the sinuses healed. A short time later he began to have pains, more expectoration and loss of weight. The film was submitted to Dr. A. F. Tyler for interpretation:

The fluid has disappeared from the greater pleural sac, but there is still some thickening of the pleura down at the costo-phrenic angle and that, as you say, there is a sequestrum of the rib which you removed. In addition, there are still areas of increased density around the right root, showing almost the same contour and slight increase in size over that in plate No. 781.

February 4, 1925. The wound had healed and the patient was feeling fine. The cough remained about the same.

February 15, 1925. Patient weighed 160 lbs., but complained of pain in the chest. He was expectorating more than usual.

April 1, 1925. Another operation was performed and the lung thoroughly explored. We were unable to find the cavity. Digital examination was made under local anesthesia and morphine through the old incision, extending it from the sternum to the axillary line. Aside from the digital examination, which extended from between the second and sixth ribs, and to the left as far as the auricular area of the heart and posteriorly to the dorsal vertebra, we punctured in all directions with a large hypodermic needle but were unable to locate the abscess.

During the operation, the patient coughed and expectorated considerable pus and bloody sputum. The blood, I believe, entered the bronchial fistual.

April 2, 1925. Upon viewing the patient this morning, he is in good physical condition and still expectorating.

May 3, 1925. After a stormy convalescence, the wound healed, and the patient had begun to regain in weight—169 lbs. Coughing has been reduced.

June 1, 1925. Weight has been increased to 180 lbs. and the expectoration has reduced to less than any time since the onset of the ill-

ness—one-fourth cup in twenty-four hours.

In July, patient applied to Government for compensation, he being an ex-soldier, which they refused, but sent him to Veterans' Hospital No. 92 for observation.

In a communication from the Superintendent there, I understand that the x ray reveals very little at this time. The patient is maintaining his weight and feels fine. Expectoration of one-fourth cup every twenty-four hours still persists.

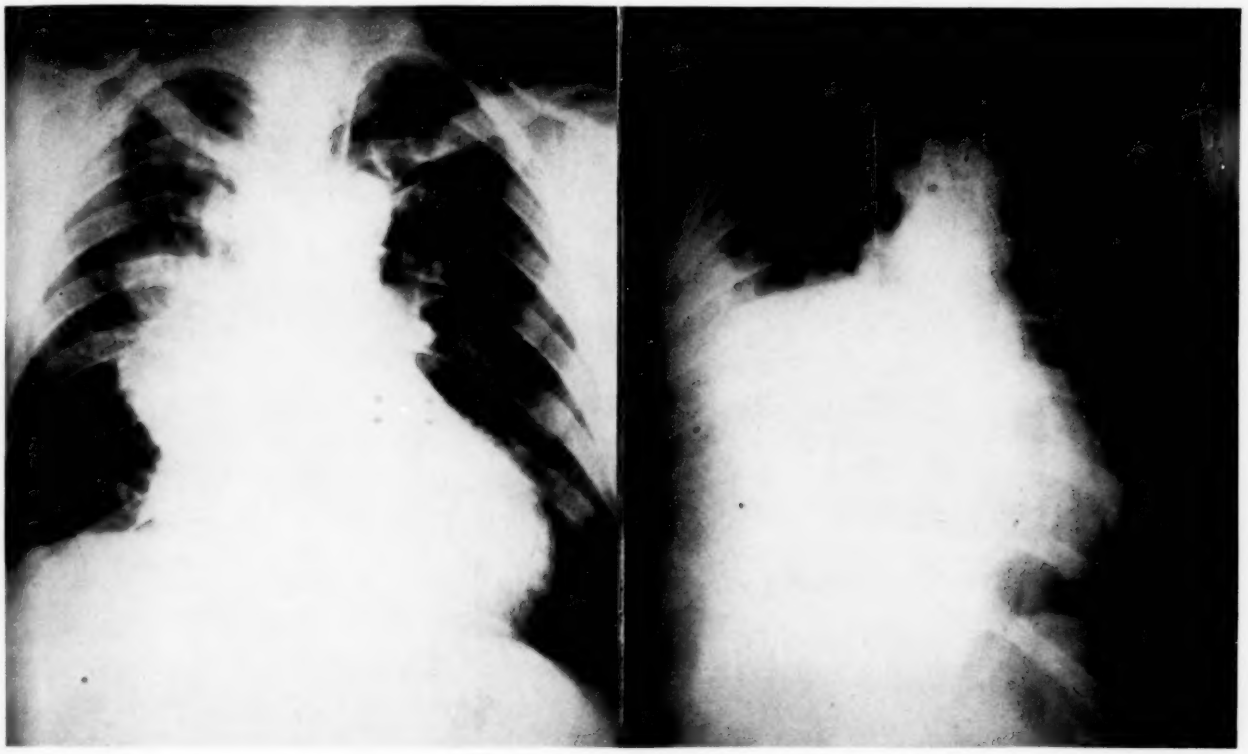

Fig. 1—Plate No. 781. A large area of increased density in the right root, with a cavity formation occurring inside. Probably a mediastinal empyema or an infection of one of the peribronchial glands which had broken down and discharged into the bronchus.

Fig. 2—Plate No. 917. An area of increased density in the region of the right root which involves the lower two-thirds of the right chest. It is suggested that pus had drained out into the greater pleural sac, probably finding its way into the greater sac by oozing out between the lobes.

NEW EQUIPMENT

The New 100-Milliampere Radiographic Coolidge Tube*

VICTOR X RAY CORPORATION,
Chicago, Illinois.

THIS tube has been developed to meet the demand of roentgenologists for a tube with a small focal spot which would permit longer periods of exposure than possible with the present radiator type Coolidge tubes, and which would also withstand the higher milliamperages as required for the newer techniques now being used in some forms of radiography.

The rating as indicated by the title given this tube is a normal rating. That is to say, a capacity for the energy represented by 100 M.A. at 85 K.V. for ten seconds (maximum), starting with a cold target. While some roentgenologists may wish to utilize the tube for still higher currents (a maximum of 350 M.A. at 55 K.V., for not to exceed one-tenth of a second), obviously this must be done under

proper operating conditions with all factors such as time, current and voltage, very accurately measured, if a useful tube life is to be obtained. This is mentioned in view of the present tendency toward the use of extremely high currents in some specialized work.

Given a tube of this high capacity, it is easy to understand that higher standards of operating conditions are imposed on the equipment with which to energize it. It is therefore advisable that these requirements be studied carefully and a thorough check be made on every vital part of the equipment before the tube is placed in circuit.

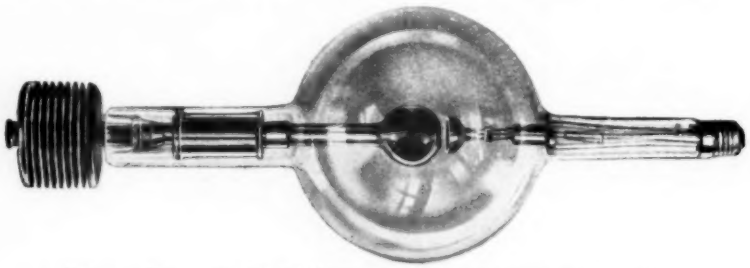

Fig. 1—The new 100-milliampere radiographic Coolidge tubes.

EDITORIAL

The JOURNAL OF RADIOLOGY

A Journal of Ideas and Ideals.

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A. F. TYLER, M. D.
Managing Editor

The Etiology of Cancer

THE etiology of cancer has been a much discussed problem for years. No other pathological condition or group of conditions has attracted so many widely diversified theories.

From the time of Galen, 200 A. D., the cause of cancer has been discussed. Beginning with the humoral theory, replaced by the lymphogeneous origin, followed by the connective or fibroblastic theory, step by step they have advanced up to the present time.

Dr. Maud Slye, with her generations of mice, has demonstrated the influence of heredity and propounded the *constitutional irregularity* theory. *Alteration or aberration of the vital activity of cells,* whereby there is supposed to be a sacrifice of the vegetative function and compensatory profuse reproductive proliferation, has met with the sanction of many. The *fertilization* theory has been almost abandoned. Here a process in the body cells was supposed to occur akin to the fertilization of the ovum. But no reason was found why the body cells required this fertilization. Cohnheim's hypothesis of 1850, *the transplantation of tissue,* still occupies an important place among the various theories. He supposed that in the course of the development of the fetal life, certain bits of tissue were displaced from where they normally belonged and in their new situation under some stimulation proceeded to grow irrespective of the other tissue. Riberts produced a modification of this idea. He conceived that the misplaced body cells in later life were stimulated by trauma or some irritation and induced to grow. This factor of *irritation* does seem to play a role in the causation of cancer. Apparently this factor of irritation so affects the cell that it loses its normal power of growth and assumes abnormal powers. Physical and chemical irritation does seem to play a part in malignant but not in benign tumors. It seems to be a factor in some growths, but cannot be used to explain the cause of others. *Parasitic* causes in a way require reasoning along this same line of irritation. From this

idea, naturally grew the *infectious* theory. To date, three factors have been active against the acceptance of this theory: (1) Never been able to inoculate; (2) cancerous metastases always follow the original type of tumor; and (3) the causative organism has not been found.

With each new theory, new hopes have sprung. We hope that Dr. Gye's claim for the isolation of the organism in connection with chicken sarcoma will prove unquestionable. Let us quote the work of Dr. Gye, as described by one who saw and believed—Erwin Smith, in the June issue of *Science:*

"Dr. Gye of the National Institute for Medical Research in London, a student of cancer, of serums and of vaccines for fifteen years and for the last two or three years intensely interested in the Rous' chicken sarcoma, has been able to cultivate the virus and multiply it in test tubes exactly as we do a living thing, and that, too, through a whole series of tubes and fluid media, and from the final tubes (7th to 9th transfer) he has obtained numerous striking infections in chickens (more than 4). His method is to put 0.02 of a cubic millimeter of the virus into 5 c.c. of his culture medium, incubate it for three days, then transfer a similar quantity of the fluid to a second tube, incubate that for three days, and so on. The final dilution of the original material, if it were merely a chemical substance, is so great as to be harmless, and the virulence (the active tumor-producing power) in the end term of the series cannot be due to diluted chemicals, but must be due to a living, multiplying organism. Any other explanation is unthinkable. There is, however, no pellicle precipitate or clouding in these fluid cultures, so far as I could see, nor is anything visible under the highest powers of the microscope; nevertheless, the organism is there, *in a particular form.* This Dr. Gye has demonstrated by means of the centrifuge. If fluid containing the virus is whirled 9,000 revolutions per minute and certain other necessary conditions are properly adjusted (I am not at liberty to state what they are), all the virus is thrown down to the bottom of the tube and remains virulent, whereas the previously infectious supernatant fluid has now become harmless as water, but even in the precipitate no organism is to be seen, stained or unstained, by the use of the ordinary microscopes. Dr. Gye has also observed another interesting thing, viz., when his culture became contaminated with cocci and other micro-organisms they cease to be virulent. There seems to be an antagonism. He formerly believed malignant tumors to be nonparasitic, but now he believes very firmly that all or most of them are of parasitic origin. He is full of enthusiasm and believes, as I do, that the solution of the cancer problem is not far off.

"It remained for the physicist, Mr. Barnard, a colleague of Dr. Gye, to demonstrate the organism, using special objectives and monochromatic light. I have been in his laboratory and have seen the body dancing about in the cultural fluid (rabbit serum) and also mounted slides of it and photomicrographs of it. It is the same type of germ as the pleuropneumonia organism, but smaller. The latter, seen first by a Frenchman, was described as resembling a yeast, but seen by the subdued monochromatic green band light of a mercury lamp and with Dr. Barnard's objective of 1.3 aperture, with which we can see up to 0.1μ, it has none of the characters of a yeast or of an ordinary Schizomycete.

"The general method of development of these two organisms, as worked out by Mr. Barnard during the last two years, is to begin as small glistening particles (I saw them under a magnification of 1,800 diameters). These apparently swell up into soapbubble-like, tiny globes, at least all sizes and gradations of such bodies appear in the fluid. Then, in the surface of the film, never in the interior, slight thickenings appear here and there. These thickenings, of which there may be several on a sphere (I saw as many as six to eight on some of the spheres), finally round off, push out into the fluid, remain attached for some time to the periphery of the sphere by a narrow pedicle and then become free, as glistening points, to go through a similar swelling and evolution. I saw nothing resembling a nucleus or protoplasmic content in any of these bodies."

In the August 7, 1925, issue of the *Deutsche medizinische Wochenschrift,* Vol. 51, No. 32, pp. 1305-6, Professor Ferdinand Blumenthal, director of the Berlin Institute for Cancer Research, presents another viewpoint in a series of critical observations on the results of Gye's cancer research:

"It would have been extremely interesting to learn the behavior of the virus cultivated from the mouse and rat tumors when it was added to the specific substance derived from the mouse and rat tumors, but Gye's report does not enlighten us on this point. He merely mentions in the summary that the rat tumor 9, the mouse cancer 63 and Jensen's rat serum, containing the specific substance of the Rous tumor, may be used in place of the virus of the rat tumor in the production of chicken sarcoma. He fails to state whether or not cultures derived from rat and mouse tumors will, on addition of the specific factor, produce likewise tumors in mice and rats. We must, however, secure such a positive result before we can, in agreement with Gye, accord to the virus any general significance for the cancer problem.

"Now, as to cancer in man, there are three cases cited, but they all deal with attempts to transfer the Rous chicken tumor. These three cases concerned were: a scirrhous cancer of the mammary gland, a sarcoma of the hip and an adenocarcinoma of the mammary gland. The experiments with the first two tumors resulted negatively, the third positively. These results show that in the case of human cancer, as well as in animal tumors, a virus was cultivated which resembled biologically the virus of the Rous chicken tumors.

"Gye concludes from his experiments that he has found and demonstrated the cancer parasite in the form of an invisible virus. He admits, however, that he has not yet adduced any positive proof of this conclusion. Before the evidence can be regarded as convincing, it will be necessary not only to propagate the parasite, but also to secure further cultures with which tumors are produced. He thinks that it is possible that there is not only one invisible virus, but that there are several viruses corresponding to the various kinds of cancer. The substances that is derived from the animal itself and which is present in each tumor is specific in that it is the decisive factor not only for the particular species of animal, but also for the variety of tumor; that is to say, that a filtrate from a sarcoma can make it possible for the parasite to produce only a sarcoma, while a filtrate from a carcinoma will give rise to only a carcinoma. The same would be true of the species of animal.

"The significance of the results of Gye's cancer researches for the etiology of cancer is possibly impaired somewhat by the fact that the so-called chicken sarcomas are regarded by most pathologists as different from the sarcoma occurring in man and as being merely infectious granulomas. In any event, of all animal tumors they are, biologically, the farthest removed from human cancer. As evidence for the asserted regular occurrence of the Rous virus in the cancer tumors, a number of interesting illustrations are furnished which we owe to Barnard's discovery of a new optical in-

strument. The appearance of the propagated virus is, however, not of decisive significance for the etiology of cancer.

"I am convinced that the reported results of Gye's researches are of paramount importance for the role of a virus or of a group of viruses in the pathology of tumors, though I do not believe that all the conclusions drawn are justifiable. It does not seem to me as yet proved that the virus cultivated from the mouse and rat tumors must be regarded as a causative agent for these tumors alone. Is it not at least equally plausible that the virus, together with a specific factor derived from mouse and rat tumors, produces the same variety of tumors in other animals? The same reasoning applies to the formation of human cancer, for in the three experiments with the Rous sarcoma two resulted negatively. For that reason, I do not think it is permissible to ascribe the inorganic production of cancer by means of tar and other irritants to parasitic influences, as Gye, as the result of his researches, seems inclined to do. Gye holds that all irritants that have thus far been shown to influence cancer formation exert a specific exaction: that is, that they bring about such changes in the tissues as prepare the way for infection. The virus then penetrates the cells, takes up its abode, propagates and produces the growth. When we recall that Bloch, Yamagiwa and others secure 100, or nearly 100 per cent, of positive results in the way of cancer formation following applications of tar, we would be compelled to include that the virus must be ubiquitous. While that is not absolutely impossible ,it has not yet been shown to be probable.

"That the study of the problem of invisible viruses has received new impetus through the researches of Dr. Gye and Mr. J. E. Barnard cannot be questioned. It is quite within the range of results of previous researches of malignant tumors to endeavor to explain the tumor-producing qualities of not only animal but also vegetable parasites recognized as causative agents in cancer, by the assumption of such a virus. Borrel discussed that possibility in connection with the various organisms which he found in the tumors of animals and which he considered causative factors in cancer formation. Fibiger suspected a virus in connection with Spiroptera neoplastica. My collaborators and I raised the same question when we had cultivated out tumefacient strains from human tumors. We regard it as quite within the limits of possibility that the bacteria outside of and inside of the tumors are laden with a virus and that this virus is further propagated with the cultivation of bacteria. In our opinion, it is probable that other organisms may make up the virus in question. Various parasites might, then, by reason of such a virus, acquire cancerogenic properties. Reichert, who investigated the tumor-producing properties of our bacilli, is likewise of the opinion that the virus may be associated with them. It must not be forgotten, however, that what Gye failed to accomplish—namely, to produce with a virus, derived from human cancer, cancer-like tumors in rats and mice—we succeeded in doing with our bacteria the results confirmed by Reichert. We have been able to demonstrate the presence of these bacilli in a third of the cancer cases examined. The bacilli themselves were not directly demonstrable in the tumor, but were found in the droplets that resulted on liquefaction of the tumor, which we, after the W. Becker method, had exposed to the sun's rays by means of a burning mirror.

"The demonstration, for the first time, of cancer-producing parasites in human cancer and their cultivation in pure culture by Auler, Paula Meyer and myself is a piece of experimental evidence which investigators of the parasitic origin of cancer in man should not pass over in silence. It would, of course, mark a still further advance if their cancerogenic properties could be shown to be uniformly due to a definite virus or a group of viruses. While Gye and Barnard have not yet succeeded in making this demonstration, their researches constitute an important step in that direction.

"Gye's demonstration of the significance of a second factor in the production of tumors is also in accord with our experiences in experiments with our neoplastic bacilli, according to which, besides diatomaceous earth, the addition of lymph from a cancerous organism was needed to produce transplantable malignant tumors. Also Reichert found that the injection of inactive filtrates of rat cancer stimulated to a more rapid growth a tumor that had been produced by our bacilli. We, also, as did the English authors, compare the second factor with what in the spontaneous evolution of cancer is termed *disposition*. That this factor is as specific as Gye assumes, I am not prepared to admit, for, with the addition of lymph from human cancer, we produced in rats our transplantable malignant tumors and have since propagated them to the fifth generation. Special interest, it seems to me, attaches also to the discovery by Gye of the fact that the virus had to be cultivated anaerobically favored markedly the propagation of the virus.

"In this connection, I wish to call attention to the significance that Otto Warburg ascribes to the fact that cancer cells are anaerobic in contradistinction to normal cells. Warburg regards the lack of free oxygen at the site of cancer formation as of great import. This view is in agreement with the experiments of my assistant, Hans Auler, which I discussed at Leningrad May 19, according to which, among other phenomena, sections of carrots inoculated in an atmosphere poor in free oxygen showed signs of tumor formation, whereas in an atmosphere rich in oxygen no such signs developed. In the meantime, Hans Auler has undertaken numerous other experiments with plants, and has thus collected further evidence to prove the stimulating effect of an oxygen deficiency on tumor formation.

"The purely experimental results of Gye are entirely in harmony with the findings reached in other ways. Not only the methodology, but also the actual accomplishments, constitute an important advance in the knowledge of the genesis of tumors. Although—in my opinion, at least—the researches of Gye have not as yet furnished us with an unequivocal solution of the problem of the origin of cancer, we can feel assured that the new methods and the facts thereby established will give a fruitful stimulus to future research."

We hope that Smith is right in his belief that the etiological factor has been determined, but the criticisms of Blumenthal cannot be disregarded. Unquestionably, Prof. Blumenthal strikes the keynote of the value of Gye and Barnard's work when he asserts that it is more than a step forward and is a marked stimulus for further research.

Bottled Radium

AN important development in the use of radium for cancer treatment is announced by Mr. S. A. Courtauld. In what will now be known as the Middlesex Hospital Radon Center the emanations from radium have been captured, purified, condensed and confined in tiny tubes called "seeds." "Radon" is the name given to radium gas. Until it was proved possible to capture radon and bottle it for distribution, the Middlesex Hospital was compelled, in the interests of its important cancer wing and its extensive research work, to husband its stock of radium and refuse to part

with small doses, in spite of the fact that it held the largest individual stock of any hospital in the world. Now it is in a position to offer to supply these curative seeds to other hospitals. By capturing the gas which would otherwise be wasted it is now possible to multiply thousands of times the curative value of any given quantity of radium. The stock of radium used in the radon center amounts to about a gramme, and is estimated to be worth between £8,000 and £10,000. It is kept in a block of lead weighing a ton, contained in a safe. The center of the block is closed by a sort of swing door of lead, which resembles the breech-block of a heavy gun.—*London Times.*

Leonard Prize Award—1925

THE awarding of the Leonard prize, offered annually by the American Roentgen Ray Society for the best original research in the field of roentgen ray, radium or radio-activity, will meet with the sanction of radiologists. This year the $1,000 award was divided by the committee into two portions. The first portion, or $600, was offered in recognition of the valuable work of Drs. Evarts A. Graham, Glover H. Copher and Warren H. Cole, all of St. Louis, for their work on cholecystography. The second portion, or $400, was awarded to G. Failla, New York, for his work on radon. Such an award symbolizes the gratitude of the entire radiological fraternity for the wonderful work of these men in developing a method which will primarily aid in the amelioration of human ills and secondarily facilitate in establishing for the science of radiology its rightful recognition by the medical profession.

International Congress of Radiology

THE first International Congress of Radiology was held June 30-July 4, at London under the presidency of Dr. Charles T. Holland. At this time an international committee was selected: Dr. Stanley T. Holland, Liverpool; Prof. Gorsta Forsell, Stockholm, and Dr. Stanley Melville, 9 Chandos St., London W. 1, secretary.

The second International Congress of Radiology will be held in Stockholm in 1928.

Albert John Ochsner, M. D., F. R. C. S.

THE death of Albert John Ochsner, M. D., on the morning of July 24, 1925, deprived the medical world of one of the ablest of teachers and most dextrous of surgeons. His illuminating and inspiring instruction, his erudite and expert surgery, his love and devotion to his work illuminating his numerous medical contributions, will forever fill an enviable place in the annals of modern medicine.

Doctor Ochsner was born in Baraboo, Wisconsin, on April 3, 1858. He graduated from the University of Wisconsin in 1884, and immediately began his study at the Rush Medical College, completing his requirements in 1886. Postgraduate work was constituted in Vienna and Berlin in 1887 and 1888.

Returning to Chicago, he began his medical career. He was united in marriage to Miss Marion H. Mitchell on his thirtieth birthday.

In 1896, Dr. Ochsner became chief surgeon to St. Mary's and the Augustana hospitals, which position he occupied until his death. Four years later, in 1900, he was appointed as Professor of Clinical Surgery at the University of Illinois.

Dr. Ochsner was first president of the Clinical Congress of the Surgeons of North America, and in 1923 was chosen as president of the American College of Surgeons. In 1924 he was elected president of the American Surgical Association of Baltimore. Dr. Ochsner was an active member of the American Medical Association, the Southern Surgical Association, the Chicago Orthopaedic Society, the Chicago Surgical Society, the American College of Surgeons and the Chicago Pathological Society.

Dr. Ochsner was a liberal contributor to the current medical literature and was the author of a *Handbook on Appendicitis*, a monograph on *Organization, Management and Construction of Hospitals*, and another on *Surgery of the Thyroid and Parathyroid Glands.*

Dr. Ochsner will be remembered by many practitioners of medicine as an ardent and inspiring teacher and by the medical profession at large as an able and proficient writer and demonstrator of the soundest of surgical principles.

ABSTRACTS and REVIEWS

The Application of Radiation in the Treatment of Malignancies: Symposium

Cancer Treatment, a Regional, Type, and Period Problem. Hugo Crouse, M. D., F. A. C. S., Texas State J. M. 21:202-207, July, 1925.

THE treatment of malignancy has advanced far beyond the knowledge of etiology. The armamentarium of treatment should consist, in the opinion of the author, in radium in ample amounts, x ray equipment of the water cooled Coolidge type of high powered 50 ma. or the 90,000 volt machine for lymphoid and cellular types of tumors, and diathermia.

The patient must be weighed, the type and location of the tumor ascertained, and its tissue relationships determined before computing the dosage. Each case should be individualized, so that the x ray dosage can be varied. No fixed dosage can be estimated; for the arbitrary standardization of carcinomatous and sarcomatous dosage is as fallacious and inaccurate as it would be in medical therapy in other human diseases and conditions.

"Deep, short wave x ray therapy with a water cooled Coolidge tube, using 40 milliamperes and from 230,000 to 250,000 volts, must necessarily be accurately dosed to be of advantage. Either Frederick's iontoquantimeter of Seeman's spectograph should be used by the laboratory giving the treatments, so that the exact dosage may be known. The indiscriminate administration of an improperly balanced dosage should be avoided. The use of the lower powered x ray machine, with its necessarily long wave lengths, is at present again gaining many an advocate. Radium gamma waves and the improved high powered x ray machine approximate one another; radium's former ten per cent advantage over the x ray has been neutralized by the latter machine."

Pre and postoperative use of the roentgen ray has become an accepted part of therapy and has proven a great aid in the treatment of malignancy.

Cancer—Fact and Fancies. Albert C. Geyser, M. D., J. Am. Med-Phys. Research, 2:97-98, March, 1925.

IN the mind of the author, the formation of cancer cells is always the result of irritation upon living tissue. This irritation may be produced from without or within the system, while the producing cause, the irritation, may be similar, the specific reaction differs in different animal tissues. According to the Mendelian law, whole families of mice have been bred by Maude Slye of Chicago, which are absolutely resistant or immune to cancer cell transplantations.

"Since the Mendelian law cannot, for some time at least, be applied to human beings, more time should be devoted to the study of the producing cause.

"Since it has been shown that a period blow of a wave length of .3 A at the ratio of one for the blow and ten for the rest period causes a complete trichopapilliatrophy, practically without affecting any other tissues, it is certainly reasonable to assume that a period law should influence cancer cells by equally selective action in a similar manner. From personal observation I am convinced that if, instead of exposing a cancerous area to a continuous dose of from five to ten hours as is done at present, the same area is subjected to periodic flashings, the result will be an immediate improvement. Just what dose or the ratio of the period should be, I am unable to say. It should not, however, be less than one for the blow and ten for the rest period. A blow of this time struck would affect hypersensitive cells while the normal cells would show a disposition to recover from the blow before the next one is struck."

The Present Status of Roentgen Rays in the Treatment of Carcinoma. Prof. Guido Holzknecht, Am. J. Physical Therapy, 1:556-557, March, 1925.

FROM the recent work that has been done on roentgen irradiation of carcinoma it would seem that, thanks to the advance in

physics and technique, gross errors in its application have been committed.

In the first place, it was a grave error to believe that all carcinoma react in the same manner to x rays. It has since been found that the dosage for carcinoma varies with the location of the disease, and the term "carcinoma dose" is meaningless. In its place the term of Von Groedel, the "toleration dose" should be substituted.

The conclusion was also erroneous, that, if the patient was not cured, the proper dose had not reached every cell. It is now known that the cell vary considerable in their radio-sensitiveness.

Two further errors have been brought to light: (1) the single application, which prevented the cells of the tumor from healing, and (2) the isolation of the tumor for the purpose of protecting the surrounding region. These two erroneous ideas were replaced by repeated irradiations and the irradiation of the neighboring tissue.

The only thing left from former work is the technical principle that one should strive to apply the same dose to cells of all depths, and the clinical fact that out of 100 operative cases of carcinoma of the uterus, 10 may be cured. If practical consequences are taken into consideration, says the author, the following conclusion is reached: Irradiation is indicated for inoperative carcinoma of the uterus, thyroid, breast, rectum, of which the last three can only be improved. All other carcinoma should not be touched. Serious consequences may result in carcinoma of the digestive tract through general impairment of the system.

"In conclusion permit me to point out that these new biological, not technical, experiments show along what lines future treatment of cancer should progress. There is no doubt that roentgen ray produces results. If one wishes to achieve more satisfactory results, one has to study cancer as the detective studies criminals. It is a goal which must not be sought by technical means—only experimental research in the treatment of cancer by x ray will disclose the point at which the cancer can be destroyed. A little technique is of course essential, but it is the pathology of the cancer which will lead the way to the treatment of the disease.

The Treatment of Malignancies by Radiation. SANFORD WITHERS, M. D., Am. J. Roentgenol, 13: 235-244, March, 1925.

THE object of the author in this paper is to present the practical points that should be kept in mind in the treatment of malignant growths by radium and roentgen rays. After a consideration of the biophysical principles governing the activity of the rays, the practical points are summarized:

1. The biological reaction to radiation depends upon the amount of energy absorbed, whether it be primary or secondary in origin.

2. The vulnerability of cells to radiation depends upon a definite histogenetic picture.

3. The resistance to neoplastic invasion and the repair of irradiated areas depends upon the well-being of the body as a whole.

4. The use of radium or roentgen rays is just as rational and radical a procedure as the use of other physical agents in the treatment of malignant conditions.

5. The optimum dose of radiation should be placed in the area of malignant growth to stimulate tissue resistance and fibroblastic proliferation.

6. Coagulation and cauterization by means of intramural radium application has the unique advantage in that the gamma rays sterilize a much wider territory than is cauterized.

7. The modern roentgen machine has greatly enlarged the scope of successful radiation theapy, both as regards the production of clinical cures and restraining the growth of radioresistant malignancies.

8. Intensive radiation therapy demands a complete clinical and laboratory study of each patient before, during and after treatment.

9. The chief field for the use of radium is as a local radiating agent applied by means of multiple low-intensity needles or "seeds" of emanation, and roentgen rays should be used for the so-called deep therapy.

10. Patients undergoing roentgen treatment, and the operators, should be protected from incidental radiation and from the noise and ionized air.

11. An oil-immersed roentgen tube has proven to be a satisfactory method of eliminating corona at the terminals and creepage along the tube.

12. Everyone operating a deep therapy equipment should be able to calibrate his roentgen machine at any time.

13. Transformer and tube life can be lengthened by treatment at 180 kv. without changing the therapeutic results.

14. Barium sulphate plaster offers an economical and practical method for screening operator and patient.

15. The proven microorganismal cause of cancer and its treatment by appropriate antisera is a possibility of the near future.

16. A mortality due to radiation exists and will be conceded legally justifiable in the future.

Combined Methods of Treating Malignancies. Application. DUDLEY JACKSON, M. D., Texas State J. M., 21:22-24, May, 1925.

THE results of the long campaign of the medical profession for the earlier diagnosis of cancer is bearing fruit, and the cancer patients are appearing at the physician's office much earlier for diagnosis and for treatment. It is only fair that the medical profession become just as enthusiastic and respond more rapidly to the call than the patient. The medical profession must become not only competent in the diagnosis of the condition, but must be broadminded enough to use the method of treatment indicated.

In a recent tour of the eastern states the author noted that in the Skin and Cancer Hospital in New York, surgery was used in practically all the cases. These surgeons had developed a wonderful technique and were producing good results. At the Memorial Hospital radium was being used in excess of any other method. Schmidt in Chicago and Phayler in Philadelphia were strong advocates of deep x ray. Clark of Philadelphia does brilliant work with electrodessication and electrocoagulation.

For the most part, therapists of today have a recognized therapeutic adjunct with which they are very familiar and from which they obtain very good results, at the same time condemning other measures. The author's view point is that all of these agents have their special virtues and when properly chosen by broadminded surgeons, many cases may be cured that are now being lost. "You can no more treat malignancy by surgery, radium, or x ray alone than you can practice medicine with only quinine and calomel! Recognize the value of each agent in its respective field, and since every case is a law unto itself, its treatment should be carefully planned for the individual case."

To illustrate, the author states: "I do not believe that the surgeon ever lived, who felt absolutely sure that he had removed every vestige of gland-bearing tissue from the axilla during a breast amputation. There might be cancer cells in the lymphatic vessel, that could only be seen by the microscope and a capsule of radium used at this time would probably devitalize these cells so that they would not be able to revive or to produce metastases. I have seen several cases of basal-cell carcinoma of the face that have been treated with paste, radium, and x ray, that are still progressing in spite of these agents. I have been unable to control some of these extensive growths by extensive dissection with electric cautery, followed by the use of soldering irons. When a surgeon uses all of these methods and does not condemn a case as hopeless until he has tried radium, x ray, surgery, electrodessication, and electrocoagulation, the thermocautery, hot irons and proper care in building up the general health of the patient, the mortality will be materially decreased and a greater number of these cases will be permanently cured."

In building up the general health of the patient, the author suggests the feasibility of transfusions of blood from youth, "flooding the system of the cancer patient with that unknown substance found in youth, that inhibits cancerous growth, as well as prevents metastasis."

Some Factors in Radium Treatment. R. CARTER CRAIN, B. S., M. D., Illinois M. J., 47:110-112, February, 1925.

IN the experience of the author, the following points have been noted:

1. The location as well as the nature of a neoplasm has an important bearing on the treatment.

2. All deep seated masses should receive intratumoral, rather than external radiation.

3. A sufficient dose must be given to destroy the tumor cells.

4. A large amount of radiation extending over a short period of time does not have the same effect as a less amount extended over a longer period.

Abdominal Deep Therapy Injuries. CLARENCE F. BALL, M. D., Am. J. Roentgenol, 13: 220-226, March, 1925.

THIS report hinges upon one case, a woman who was given postoperative radiations following a panhysterectomy for early squamous cell cancer of the cervix uteri. The case ended fatally and upon autopsy no metastaseal explanation of definite primary pathological

changes arising from the condition necessitating her operation could be found sufficient to explain the fatality. However, sufficient pathology could be demonstrated as the result of the roentgen ray treatments. For this reason the author suggests that:

1. More attention should be given to the dosage factors in relation to body mensuration.

2. Adjustment must be made for the part played by the promontory of the sacrum in setting up injurious accumulative secondary rays to overlying tissues, although this is not supported by experimental evidence.

3. Bowel injury should be guarded against by alterations of position during prolonged treatments, and the use of pituitrin is urged, preferably into the nares, before starting a treatment.

4. More careful examinations must be made relative to any possible associated conditions, and allowances made for same.

5. Postoperative prophylactic short wave roentgen wave therapy is analgous to an elective major operation procedure and similar "check up" precautions are imperative.

The Role of X Rays in the Strobell Chemical Operation for Cancer of the Breast. C. W. STROBELL, M. D., Am. J. Electroth. & Radiol., 43:88-92, March, 1925.

IN the application of the chemical treatment for the removal of cancer of the breast, the author and instigator of this method of treatment states that he has no objection for the preoperative use of the roentgen ray as long as fibrosis is not produced. Fibrosis or any increase in the density of the breast tissue, renders it more difficult for the seepage of the zinc chloride into the tissues and for the production of the death of the cancerous mass. However, postoperative roentgen therapy is strongly recommended by him to aid in combating persistent complications and to safeguard against the possible negligence of the chemical agent to reach all the metastasized cells.

CUTANEOUS SYSTEM

Moles, Warts and Epithelomata. ROY BLOSSER, M. D., Rhode Island M. J., 8:71-75, May, 1925.

SIMPLE moles are removed by the author by the means of electric cautery or by caustics. No harm is done if the patient is beyond forty years of age.

The exact cause of warts has not been found. Formerly they were removed either by excision, or some form of chemical cautery. On some the electric cautery has been used, but until the advent of the x ray plantar warts were unsatisfactorily treated.

Epitheliomata should be suspected in all persistent nodular, crusted, or ulcerated lesions developing slowly after middle life. If located on the face at some point above the upper lip or on the ears and if pigmented they are in all probability basal-celled in type and can easily be dealt with.

Epitheliomata of the tongue, lips or other mucocutaneous junction are probably squamous-celled in type; early operation my be effective, but if metastases have occurred these must also be dealt with.

Any bluish or blackish tumor developing on any part of the body suggests a very grave prognosis unless dealt with radically before metastases have occurred. In these cases extensive x ray or radium treatments are given.

X Rays in the Treatment of Various Inflammatory Conditions. SIMON ALBERT, M. D., Rhode Island M. J., 8:90-92, June, 1925.

ROENTGEN treatment of varions types of inflammatory conditions is not something new in therapeutics. The foreign literature particularly has frequent mention of its great value.

In the treatment of felons, paronychias, and carbuncles, radiation is an extremely useful adjunct to surgery. Both acute and chronic conditions nearly always respond favorably. The best results, however, are obtained in the early stages of the various processes, at the time when severe reactions have not yet become manifest. In the very early stages, these infections can be aborted with great frequency.

In painful neuralgias, x ray treatment should not be forgotten. It will frequently give relief when all other methods have failed. It should, in the opinion of the author, be given a trial before attempting surgical procedures.

The dosage consists of very small fractional units. Overdosage must be guarded against.

The Treatment of Trichophyton Infection with the Long Wave Light Rays. EDWARD AHLSWEDE, M. D., Urolog & Cutan. Review, 29: 337-339, June, 1925.

IN the treatment of trichophyton infections a great deal depends upon the location of the diseased area. In trichophyton infections it is desirable that it should not be allowed to come to pus formation. For the treatment of superficial inflammations, the length of the exposure is proportioned to the intensity of the inflammation. It is best to begin with a ten minute exposure in order to test the reaction of the diseased area. This is continued along with the application of soaps and the various sulphur and ichthyol salves. Tincture of iodine and rays of long wave length alternately afford excellent means of stimulating and soothing the inflammation.

As in the treatment of the superficial infections, a combined roentgen ray and red light therapy affords the best combination for the deep forms of the disease. The author also advocates the preliminary injection of nonspecific substances which act as an irritant and prepares the way for the action of the rays of the long wave length. The approved action of salves, epilation, etc., are not to be neglected in the deeper forms.

GASTRO-INTESTINAL SYSTEM

Roentgen Ray Treatment of Tonsils and Adenoids. P. B. MacCready, M. D., Am. J. Roentgenol, 13:424-428, May, 1925.

CLINICAL and pathological studies show that the roentgen ray treatment when given in sufficient doses causes a definite shrinkage of the lymphoid issues of the tonsils and to a less extent of the adenoids, for they were not irradiated directly. Bacteriological and pathological studies show that roentgen ray treatment has no effect on local sepsis in the tonsils and adenoids. These two facts would clearly outline the type of patient where roentgen treatment would be beneficial.

Many children have frequent colds and sore throats and difficulty in breathing as a result of the hyperplasia of the tonsils and adenoids. Many of these children outgrow these symptoms at puberty, so that the wholesale subjection of children to operative procedures has little foundation. Roentgen irradiation offers the ideal treatment as it provides a means of shrinking the tonsillar tissue without subjecting the child to the dangers of the operation. The results of the author show only one failure in nine cases. On the other hand, where there is evidence of local sepsis in the tonsils and adenoids, roentgen treatment does not help and surgery is indicated. Local sepsis can readily be determined by the history of acute tonsillitis, suppurative otitis media, tuberculous cervical adenitis, infectious arthritis, diptheria carriers, etc., along with the signs of infection in the tonsil other than simple hypertrophy.

Opaque and Nonopaque Foreign Bodies in the Gastro-Intestinal and Respiratory Tracts. J. W. Landham, M. D., J. M. A. Georgia, 14:237-240, June, 1925.

OPAQUE and nonopaque foreign bodies in the gastro-intestinal or respiratory tracts demand the utmost skill of the radiographer, internist and bronchoscopist. Opaque foreign bodies are readily observed by the radiographer, but it is the nonopaque bodies that are difficult to localize. By use of a barium meal, pylorospasm, reverse peristalsis, or obstruction to the onward path of the meal, commonly demonstrates the nonopaque mass. In determining its location in the respiratory tract, the predominating roentgenographic findings are:

1. Increased transparency on the obstructed side before lung pathology exists. After the bronchi are filled with secretions and other lung pathology is present there will be increased transparency on the unobstructed side.

2. Depression of the diaphragm and limited diaphragmatic excursions on the affected side.

3. Displacement of the heart and mediastinal contents toward the unobstructed side.

Chronic Appendicitis. A. G. Schnack, A. M., M. D., Am. J. Roentgenol., 13:438-441, May, 1925.

THE large clinics are content with a single day roentgen-examination of the gastro-intestinal tract, but the author roentgenoscopes and palpates his case at six, twenty-four, forty-eight and frequently seventy-two hours. If there is no history of constipation, catharties are avoided, but when deemed necessary they are given forty-eight hours before the examination.

By chronic appendices, the author includes those appendices which produce symptoms of distress to a greater or lesser degree over a considerable period of time. These symptoms may be local or remote from the source of irritation. The gross pathology may show a vascular congestion with a little tissue edema, or

nodular thickenings due to sclerotic scars from previous local ulcers and infections, or denudation of the mucous membrane, or scars obliterating the lumen.

"We believe that an appendix that does not produce the usual 'reflex' roentgen findings has very little to recommend it as a source of danger. These findings, briefly mentioned, are generally pylorospasm, duodeno-bulbar spasm, erratic and marked degrees of reverse peristalsis in the small bowel, a tendency to a delay in the stomach emptying, ileal delay, and often a definite degree of spasticity of the transverse and descending colon. Most of these findings are usually present. To these 'reflex' findings we add the local signs of a tender appendix, marked irregularities in contour, definite kinks, bulbous appendix tip, local dilation of the appendix, fixation, evidence of adhesions to neighboring organs such as the duodenum, cecum, etc."

Appendiceal stasis is a potential source of future trouble, which may develop very slowly, or by periodic exacerbations. Examining for appendical stasis such an appendix over several days makes one more certain of true local conditions. It may be pretty definitely stated, writes the author, that an appendix which fills and empties within the forty-eight hour period cannot be pathological, unless we include slight congestive states as pathological.

"The treatment, in most cases, consists in building up the colonic tone by proper exercise, rest, posture correction, stimulating food materials, removal of gas-producing foods, etc. Abdominal massage and abdominal muscle exercises, and attempts at regular bowel movements, often aid. Unless cecal stasis can be remedied we constantly have the possibility of graver appendiceal symptoms developing, but until we do find direct evidence of more definite appendiceal irritation the treatment should be for constipation rather than by appendectomy. With the improvement in the cecal stasis the so-called appendiceal signs often disappear."

CIRCULATORY SYSTEM

Purulent Pericarditis in Childhood. Alfred C. Wood, M. D., and Wm. N. Bradley, M. D., Atlantic M. J., 28: 436-445, April, 1925.

THE frequency of purulent pericarditis in childhood with its infrequency of recognition and consequent high mortality is a troublesome fact to most clinicians. The symptoms are so varied depending upon the amount of involvement and complications encountered, that there is no outline to be given of the symptomatic indications used to establish a diagnosis. Recently the x ray has been used by many observers to great advantage in establishing the diagnosis. C. W. Perkins is quoted by the author in a summary of the x ray findings in pericarditis with effusion:

1. Heart globular in shape and enlarged symmetrically, with widened base.

2. Heart shadow larger in the recumbent posture than in the vertical posture.

3. Diminished impulse of the heart under fluoroscopic examinations. This is due to presence of sac fluid.

4. The obliteration of the costocardiac angle, due to fuid in the pericardial sac, we feel is unreliable, as conditions of the pleura and lungs involving that region stimulate distention and enlargement of the heart.

The author believes the x ray to be a valuable aid in the diagnosis of pericarditis in children; only, however, when studied in connection with physical findings. It aids very materially in pointing out other associated complications.

Electrocoagulation and Electrodehydration Treatment for Hemorrhoids. Mel R. Waggoner, M. D., J. A. Med.-Phys. Research, 2:40-42, December, 1924.

FOR the fulguration method of treatment, by the indirect method, the author connects the active terminal to the patient and with a metal probe draws the current out of the patient at the site of operation.

The methods which the author appears to prefer are the electrodehydration and electrocoagulation methods whereby "in the electrodehydration treatment from 500 to 1,000 milliamperes of current is used. For coagulation, use 1,500 to 2,000 milliamperes. The technique is the same for both. Connect your block tin to the patient's back. Make a right-angle bend in your coagulation needle and coagulate from the heel of the bend rather than the point. Bend up about a quarter of an inch of the needle. This also lets you make a little traction so that you can pull the pile away. Flash the current on for an instant. In the dehydration method, the flesh tumor will blanch; stop when this occurs. In the coagulation treatment, flash the current on and off until the tumor is entirely coagulated and has

a dead appearance. . . . It is better to coagulate almost up to the point of attachment of the pile, leaving a sixteenth or an eighth of an inch of the tumor, which will shrink and be absorbed in the process of repair."

A Note on Alteration in Blood Sugar Values After Intensive Deep Roentgen Irradiation. H. Flecker, F. R. C. S., and Gordon Cameron, M. B., B. S., M. J. Australia 1, 12th year: 478-480, May, 1925.

USING guinea pigs for their experimentation the authors administered varying degrees of an erythema dose. Certain of the animals were killed at different times after exposure of the intestines, liver and pancreas were taken and examined. Other animals were observed as late as three or four weeks after the irradiation.

"In all of the animals we noted a temporary depression of the blood sugar value within twenty-four hours after exposure with a return to normal limits within four to eight days."

Certain changes were also noted in the organs examined. "In the pancreas in several of the animals we found a thinning out of the granules of the beta cells of the islets of Langerhans, associated with a vascular hyperemia, lasting several days and followed by a gradual relative increase in the number of alpha cells, as determined by differential counts of the islet cells. Small necrosis also occasionally appeared usually not before the eighth day after irradiation and involving mainly the acinar tissue. Occasionally in the liver and not necessarily connected with the pancreatic changes, we found extensive fatty degeneration of the liver cells, sometimes confined to the center of the liver lobule, at others mainly peripheral. We also found silght necrosis and desquamation of the superficial epithelium of the intestine in a few animals."

"Our observations on human beings are few in number. Of six patients who were treated with deep x ray therapy by an upper abdominal exposure and in whom careful examination of the blood sugar value was possible, definite results were obtained in two only . . . one a carcinoma of the body of the pancreas, one a carcinnoma of the pylorus. . . . Much the same type of result as obtained in the animal experiments was seen."

Physiotherapy for Diabetes. C. C. Moyar, M. D., J. Am. Assn. Med-Phys. Research, 2: 133-134, April, 1925.

THE treatment of diabetes, according to the author, resolves itself into four phases: 1, diet; 2, elimination; 3, hormone stabilization; and 4, physiotherapy. "By autocondensation we have innervated the general circulation with consequent raising of the nerve energy index. Diathermy has attacked the inflammatory exudates and brought more blood to the treated and has revivified every cell in this area as no medicine can do. The sinusoidal currents have stimulated peristalsis, unloaded the liver and gallbladder and aroused the remnant of pancreatic function. The static wave current has essentially activated the whole scheme."

Diabetes. Omar T. Cruickshank, M. D., J. Am. Assn. Med-Phys, Research, 2:134, April, 1925.

THE treatment that is outlined by the author for diabetes is as follows: Place the patient in dorsal position on a couch with an aluminum plate, 10 gauge, 6 by 14 inches, under the kidneys. If the back is curved, place a small pad or pillow under the plate, which of course, must be in direct contact with the bare back. Connect this plate to one current outlet post of your machine. Connect a five inch disk to the other outlet for the diathermy current. Place the disk over the epigastrium, turn on a mild current and gradually increase current to a point where it requires about five minutes for the patient to complain of it being warm. Then shut off the current and move the disk just below right costal arch and repeat the process over the left side. Next treat in same manner over the bladder, and finish by treating over the epigastric region. At least half an hour is necessary to give the treatment and be sure that the entire abdomen is well warmed up. This treatment can be given very well by using an autocondensation chair in place of the aluminum plate, using the five inch disk as described above. About 1,500 to 2,000 milliamperes is the proper current to use.

OSSEOUS SYSTEM

Preventive Orthodontia. J. H. Mason Knox, Jr., M. D., Dental Cosmos, 67: 494-500, May, 1925.

OBSERVATIONS were made on that part of the field of preventive medicine in which the pediatricians and the orthodontists have a common interest.

The subject that is of particular interest to the radiologist that is discussed in this article it rickets. Rickets is a deficiency disease. That deficiency is the inability to percipitate calcium into bone. The disease may be obviated in one of two ways: (1) supplying the fat-soluble A vitamin by means of cod liver oil or (2) by administering the ultra violet ray, whether it be from its natural source, the sunlight, or artificially by means of the quartz lamp. Sunlight and diet are the two elements that should be carefully controlled and rickets can be prevented.

Rational Treatment of Fractures of the Lower End of the Radius. SAMUEL W. BOORSTEIN, M. D., F. A. C. S., Am. J. Surgery, 39: 50-56, March, 1925.

AFTER carefully considering the various fractures that can occur of the lower end of the radius and the method of establishing the diagnosis and instigating the immediate and after treatment, the author mentions the importance of radiography. From the viewpoint of a correct diagnosis, the author recommends that the x ray be used to determine the nature of the fracture. Such a precaution will abort numerous legal entanglements. Whenever it is possible the author suggests that the fracture be reduced under fluoroscopic guidance. If this cannot be accomplished, the part should be roentgenographed after reduction.

Notes on a Tumor of the Spinal Cord Located by X Ray Examination. A. ABELHEIM, M. D., South African M. J., 23:127-129, March, 1925.

IN this article the author reviews the history of a case of tumor compressing the cord at the level of the first and second lumbar vertebrae. The object of this article is to emphasize the method elaborated by Prof. Sicard of Paris of injecting an opaque fluid into the spinal theca and locating the tumor by radiography.

With the patient in an upright position, head bent forward, the operator inserts a lumbar puncture needle to a depth of 4 cms. between the occiupt and atlas, after preliminary anaesthesia with novocain and adrenalin. Instead of the lipiodol, or poppy oil, containing 40 per cent iodine, the author used iodipin or sesame oil containing 20 per cent iodine. The iodinpin is supposed to be less irritating to the spinal cord.

Roentgen Ray Therapy of Thrombo-Angiitis Obliterans. HERMAN B. PHILIPS, M. D., and ISIDOR S. TUNICK, M. D., J. A. M. A., 84:1469-1472, May 16, 1925.

THE application of the roentgen ray to thrombo-angiitis obliterans after an unsatisfactory investigation occurred to the authors by chance. Irradiating the hypertrophied prostate in an effort to produce its involution in one of the referred patients incidentally resulted in an improvement of the accompanying vascular disturbance. The first reaction was only natural—subsequent irradiation of the prostates and testes for the amelioration of the vascular malady. It was later learned that the action was the result of the roentgen ray upon the obliterating vessels.

"The roentgen ray technique used in the beginning of the investigation has remained the same throughout the entire series. The doses are essentially stimulating ones and consist of from ten to fifteen minutes' exposure, alternating at weekly intervals over the midanterior and posterior aspects of the body, from the tenth dorsal to the fifth lumbar vertebrae in lower extremity affections, and over the cervical and upper two dorsal segments in upper extremity disturbances. The following factors were used: 5 milliamperes, 100,000 volts, 5 mm. aluminum filter, 15 inch distance. An infrequent sequel of irradiation, encountered in only a few cases, was a transitory nausea, which quickly subsided. The results in stimulative roentgen ray therapy are attributable to increased activity of metabolic processes, particularly phagocytosis, and to biochemical changes, similar to those produced in the establishment of immunity."

In the presentation of this treatment five cases are reported to illustrate the progress noted.

Backache Due to Industry and Disease. JAMES WARREN SEVER, M. D., Boston M. & S. J., 192; 647-658, April, 1925.

THE causes of traumatic back injury are very varied, and may be intrinsic or extrinsic, the result of direct or indirect injury. Trau-

matic back injuries are divided into three classes: (1) Those due to lifting strains; (2), those due to contusions on the back from a fall or by being struck by some object, the injury being only to the soft parts; (3), those due to an accident where there is a bony injury.

In the first class falls the muscle and ligamentous tears. The roentgen ray is of value to rule out destructive pathology.

In the second class contusions predominate as the result of forced hyperextension or over extension.

In the third class the roentgen ray plays its leading role. Compression fractures following a fall causing narrowing of the intervertebral diameter of the third to fifth lumbar, rheumatoid arthritis or spondylitis deformans with the characteristic bony spurs, tuberculosis of the spine demonstrated by hyphosis or vertebral destruction, malignancy resulting in the destruction of the vertebra, sacro-iliac sprain with its essentially negative x ray findings, all require the aid of the roentgen ray to establish the diagnosis and determine the method of treatment to be instituted.

GENITO-URINARY SYSTEM

Radium in Gynecology. Chas. E. Sayre, M. D., Nebraska M. J., 10:168-173, May, 1925.

THE first portion of the paper contains a discussion of the physics of radium. The penetrability of the rays is demonstrated by a consideration of the velocity and absorption of the rays. The alpha rays travel at a rate of 10 to 12,000 miles per second. The beta rays have about 100 times the penetrating power of the alpha rays, and the gamma rays are from 10 to 100 times more penetrating than beta rays. One-half of the beta rays are absorbed by one-tenth mm. of lead and is completely absorbed by two mm. of lead. The hardest gamma rays, according to Rutherford, are half absorbed by 26.5 cm. of soft tissues.

The author cites Curtis of Chicago as having done some pioneer work with radium in chronic leukorrhea with apparently favorable results.

In discussing the old problem of menorrhagia, the age question plays an important role. In young girls and young women in whom the menstrual function should be retained the writer advocates the use of from 200 to 400 mg. hours, while in patients 35 to 40 years of age, there is greater danger of malignancy and every case should be curetted and the scrapings sent to the laboratory for examination. All such fibroids or myomas should receive not less than 1,200 mg. hours for the smallest and usually 2,400 mg. hours are given.

"Personally, I am rather averse to using radium in fibroid tumors of the uterus, except where the tumors are small, the patient near the menopause or the patient a bad surgical risk, as a dose of radium large enough to relieve the hemorrhage will almost certainly bring on the menopause."

In regard to the question of cancer of the uterus, the writer is prone, in early cancer of the fundus, to resort to hysterectomy following the Wertheim technique.

"This is not a complete review of the literature, but reports on 765 cases of uterine hemorrhage of the results obtained by the various authors, varying from 95 to 100 per cent successful. Eight hundred eighty-three cases of fibroid tumors, with practically the same results, and 1,092 cases of cancer, with good results in inoperable and recurrent cases of from 17.6 to 44 per cent. Cases that are hopeless from a surgical standpoint.

"In the inoperable cases the cures by various authors vary from 64.1 to 86.6, which is much above the reports of any surgical clinic; therefore, I believe we are warranted in agreeing with Clark and Oshsner in saying all cases of cervical carcinoma should be treated by radium and none subjected to surgery."

Diagnostic and Therapeutic X Radiation in Pregnancy. W. A. Newman Dorland, M. D., and M. J. Hubeny, M. D., Illinois M. J., 47:362-365, May, 1925.

THE danger of diagnostic x radiation lies in the administration of too severe an exposure or the repetition of the radiation without sufficient interval of time elapsing between exposures. It is the opinion of the authors, and they believe the opinion of most obstetricians and radiographers, that when used for the short time that is necessary to obtain a diagnostic plate, especially if the exposures be made at suitable intervals of time, there is no danger of unpleasant or disastrous sequelae to either the mother or child.

"How long a time is required in order to obtain good diagnostic plates of pregnancy? A few seconds only. It is the custom in the

x ray department of the Post Graduate Hospital, Chicago, as followed by Dr. Cushway, and also in our private laboratory, to make exposures of but four seconds, using a spark gap of from four to five inches. Peterson makes an exposure of from eight to twelve seconds, with a spark gap of from five to six inches, a focal distance of from 28 to 30 inches, the kilovoltage varying from 45 to 55, and the milliamperage from 20 to 30. Candy, of England, makes an exposure of about five seconds, using 25 to 30 milliamperes with a spark gap of five and one-half inches. Double screen superspeed films are used in addition to the Potter-Bucky diaphragh."

The diagnostic value of radiography in pregnancy is both positive and negative. By the abdominal route, the patient lying face downward, and especially by Edling's subcoccygeal method, it has become possible to recognize fetal bony structures, notably the head and spinal column, at from three and one-half to four and one-half months. Of course, visualization of the fetal structures is conclusive evidence of the presence of gestation. It may also prove of value in the determination of the relation of the size of the fetal head and the size of the pelvic inlet. Radiopelvimetry is still in its infancy, and radiography of pelvic deformity is imperfectly developed. The value of negative radiography may be anticipated when one considers that Peterson regards it as almost obligatory for the abdominal surgeon to employ the x rays before attempting a hysterectomy for supposed fibroma or myoma of the uterus, especially when such a growth is accompanied by menstrual suppression at or about the time of menopause.

Therapeutic x radiation has been largely used in recent years for the control of hemorrhage due to uterine tumors or to hemorrhagic endometritis, or for the purpose of inducing temporary or permanent castration of a patient suffering from a grave affection, as tuberculosis or Basedow's disease. It is well known that the hemostatic action of the rays results from their influence upon the ovaries, and not upon the uterine tissues. So, Seitz and Wintz have calculated that a temporary castration may be effected from a dose which is from 30 to 32 per cent of the erythematous dose, and a permanent castration may be produced by a 36 per cent dose.

But the dangers from such doses may be fully realized after a careful consideration of the case reports enumerated. The authors enumerate the dangers under four heads:

1. A temporary or permanent sterility of the woman may result from a destruction of the germinal elements of the ovary.

2. The follicles, if not destroyed, may be so injured or altered as to result in the development of abnormal offspring showing imperfect or defective growth of the whole or parts of the embryo, or even in the formation of monsters.

3. The growing embryo may be so damaged as to result in death of the embryo and early abortion.

4. The fetus born apparently normal may show postnatal defects in its development, or the irradiation, occurring late in pregnancy, may show a disturbance of the metabolism later in life.

"Bailey and Bagg believe that irradiation during early pregnancy may produce death and abortion of the fetus; and that irradiation during late pregnancy is not so likely to produce gross developmental abnormalities in the child at birth, but may cause retardation of growth subsequent to birth. They believe that irradiation of the ovum during early pregnancy should never be permitted, and that in later pregnancy it should be resorted to with extreme care."

Pelvimetry of the Superior Strait by Means of the Roentgen Ray. HERBERT THOMS, M. D., J. A. M. A., 85:253-256, July 25, 1925.

THE chief difficulties to overcome in consideration of roentgen ray pelvimetry are twofold: 1, the position of the patient; 2, the distortion that takes place because of the distance of the plane to be measured from the photographic plate.

To meet these difficulties the author has developed a reclining chair. The patient, seated in this chair, leans backward, the back arched up so as to tip the pelvis forward and downward. In this manner the superior strait lies parallel with the sensitive plate, which is located beneath the Bucky diaphragm—the seat of the reclining chair.

Such a simple measure, if it proves applicable to the roentgen raying of obstetrical patients, will be of distinct value. It has a distinct practical application in cases in which a contraction of the superior strait is suspected, or those in which there is no enlargement of the fetal head at full term. In the latter in-

stance, the size and shape of the head must, of course, be determined.

Roentgen Therapy of Uterine Myoma During Pregnancy. JOHN D. LAWSON, M. D., Calif. & West. Med., 23:301-306, March, 1925.

AFTER a most careful review of the literature on the question of the value, indications and contra-indications of extensive roentgen treatment in the pregnant woman, the author draws the following conclusions:

1. Pelvic irradiation of females who may become pregnant should be done with much care in selection of cases, and either only very light dosage employed or complete castration effected.

2. Pelvic irradiation of pregnant females should not be done except where there are very extenuating circumstances, and in any event the patient and her husband should be informed of the possibility, if not the probability, of a deficient child.

3. Irradiation during the latter months of pregnancy, if conclusions may be based upon the results in six cases, is less injurious to the fetus than irradiation during the early months.

4. It would seem that the longer the lapse of time between irradiation and subsequent pregnancy, the greater is the possibility of a normal child being born.

5. Radiography should be limited during pregnancy to the minimum.

6. Roentgen abortion or castration should never be performed except where there are definite reasons why the ordinary surgical procedures should not be followed.

7. There seems to be little difference between the actions of the long and short waves on ova, either fertilized or unfertilized.

Treatment of Benign Uterine Hemorrhage With Radium: an Analysis of 138 Cases. R. A. SCOTT, M. D., F. A. C. S., Illinois M. J., 47:455-457, June, 1925.

AS the result of this analysis of 138 cases of benign uterine hemorrhage treated with radium, the author presents the following observations:

1. In the treatment of benign uterine hemorrhages radium therapy has its greatest usefulness in women past the age of forty. In younger women small dosages of radium are sometimes used. The use of radium in adolescent bleeding is not as popular as at first; its use in this type of bleeding is confined mostly to the cases that have not responded to glandular therapy.

2. Radium therapy is contra-indicated in the presence of pelvis infection, past or present.

3. Only fibroids smaller than those simulating a three or four months' pregnancy should be treated with radium. Large fibroids and those obstructing the cervical canal should be treated surgically.

Radiographic Evidence of the Association of Ureteral Stricture and Urinary Calculi. GUY L. HUNNER, M. D., Am. J. Roentgenol., 13:497-523, May, 1925.

THE presence of a calculus in the kidney or ureter is presumptive evidence of a coexistent ureteral stricture. Ureteral stricture is probably of blood borne origin; hence, as one would anticipate under such circumstances, it is practically bilateral. The symptoms and many of the pathological changes which were formerly ascribed to the presence of a stone are probably more often the result of stasis due to the stricture. To substantiate these conclusions, the radiographic evidence of thirteen cases, comprising 36 pictures, is offered.

New Electrodes for the Application of Diathermy to the Prostate. MAXIMILIAN STERN, M. D., Am. J. Roentgenol., 13:545-549, May, 1925.

THE prostate electrode introduced by the writer consists of an insulated shank carrying through its lumen two shafts, bearing blades, which are controlled by two levers attached to the distal ends of the shafts. The blades are so shaped that when closed and in apposition they are readily inserted into the rectum and when open are of the same contour as the prostate and seminal vesicles.

The urethral electrode consists of an insulated shank and handle, the exposed metallic portion which occupies that prostatic urethra, and the insulated tip, which prevents cauterization of the bladder when the indifferent electrode is erroneously applied to the suprapubic region.

MUSCULAR SYSTEM

Diathermy for Injuries of Athletes. S. EDGAR BOND, M. D., J. Am. Assn. Med.-Phys. Research, 2:130-131, April, 1925.

INJURIES to athletes, especially those obtained during the routine daily practice, are usually cared for my nonmedical men, particularly masseurs, rubbers, etc. The customary method among medical men in the treatment of these injuries is to secure immobility of the injured part in order to lessen the pain. This procedure, especially in the treatment of sprains and bruises, favors a stasis of both blood and lymph circulation, resulting in congestion, swelling, discoloration and immobility. This is against all our teachings, for rapid curative measures are dependent upon a free flow of the currents of blood and lymph.

"When the injured structures are superficial or within the trunk, the technique of the treatment is of comparative simplicity. It is merely one of selecting the proper size of electrodes, adjusting them so that the heat will be generated where needed and exercising a proper control of the amount of current employed. When the treatment is to be applied to the limbs or small structures of the body, great care must be taken to avoid chafing, irritation and sparking, lest a burn result..... After the electrodes are properly placed, the current is turned on at a low amperage and gradually increased to the tolerance of the patient. This, depending upon the size of the electrode and the sensitiveness of the patient to heat, will vary from 300 to 1,500 milliamperes of current."

Physiotherapy in the Treatment of Industrial Injuries. GUY E. BARR, M. D., Journal-Lancet, 45:212-215, May, 1925.

STATISTICS gathered by some of the foremost authorities and verified to the satisfaction of the author, prove that physiotherapy applied to industrial injury cases aid materially in their improvement:

1. Physiotherapy reduces the period of disability 30 to 40 per cent and in some cases more.
2. The amount of total disability is reduced 30 per cent or more.
3. Labor is conserved by putting the laborer back to work in a shorter period of time.
4. The injured skilled employee is restored to his maximum working efficiency, thus keeping production up to its highest point.
5. Good will is created between employee and employer.

The Technique of Masso-Therapy. PETER V. MONTVILLE, J. Am. Med.-Phys. Research, 2:154-155, May, 1925.

THE procedures of massage are divided into the following classes, each receiving its miniature discussion as to technique: touch and pressure, stroking, friction, kneading and joint movements.

A Case Report of Multiple Myeloma. WEBSTER W. BELDEN, M. D., Am. J. Roentgenol., 13: 442-447, May, 1925.

THE disease multiple myeloma is characterized by multiple lymphocytic, myelocytic or plasma cell invasion of the bone marrow throughout the body. This growth is slow and rare of occurrence. Although its favorite site is in flat bones, it may be found in the long bones.

The diagnostic points, although not entirely reliable, are grouped by the author as follows: The lesions are multiple and the bones are pierced by small focal spots of destruction, which are not confluent. The tumor does not expand nor destroy the cortex. There is a marked rarefaction of bone, which may cause a thinning of the cortex. Pathological fractures are common. Bence-Jones bodies are found in the urine, with the atypical roentgen findings, generally leading to a correct diagnosis. Roentgen therapy has been tried in these cases and, although it is not curative and probably does not even arrest the course of the disease, nevertheless, the pain has been very strikingly relieved, and for this reason alone its use is desirable.

In the case report presented in the article, roentgen radiations produced relief and checked the advancement of the condition. Radiation with the Alpine lamp relieved the pain. Roentgen examination, following the radiation ehtrapy, showed repair of three fractures of the femur, but no repair in the latest fracture of the left femur. The tumor in the pelvic bones had advanced.

NERVOUS SYSTEM

A New Treatment for Infantile Paralysis: The Radio-Diathermo-Therapy. H. BORDIER, M. D., J. Am. Assn. Med.-Phys. Research, 2:145-147, May, 1925.

RADIO-DIATHERMY treatment has long been advocated by the writer in the treatment of anterior poliomyelitis. Radiotherapy makes it possible to reach the inflammatory lesions of the motor cells of the cord which correspond to the region supplied. The x rays are supposed to act on the injured cells and stimulate progressively their more or less complete regeneration, depending on the dose absorbed, the promptness of institution of treatment and the virulence of the infection. Diathermy is used to develop in the atrophic and hypothermic tissues the heat which is necessary for the nutrition of the muscles and to relax the vascular spasm.

In the treatment instituted two things demand attention: (1), The technique of application necessary to insure sufficient dose, and (2), the region through which the beam of rays must pass to reach the injured cells. The technique for application is not given in this article, but references are made to other writings by the same author.

Electrotherapy in Paralysis Following Peripheral Nerve Lesions and Poliomyelitis. RICHARD KOVACS, M. D., Am. J. Electroth. & Radiol., 43:98-105, March, 1925.

A CLOSE co-operation of the electrotherapist, orthopedic surgeon and the neurosurgeon are imperative in every case of paralysis following poliomyelitis. The earlier the proper physical measures are instituted the more satisfactory will be the results. Electrical currents simulating the natural physiological impulse are the most valuable single agents in maintaining and restoring the power of paralyzed muscles. Rhythmically varying currents of low tension are the most effective.

However, no electrical modality should be instituted in any case without a preliminary accurate electrical and nerve test.

In muscles lacking faradic response, as they do in all cases of real paralysis, the slow galvanic or sinusoidal current is the method of choice. It produces a stimulus of long duration and slowly surging quality to which the paralyzed muscles respond very gently and painlessly.

While electrical stimulation is the main therapeutic standby in improving the condition of paralyzed muscles, other therapeutic agents, such as radiant light, heat, massage and manipulation are of considerable importance and occupy a necessary place in the therapeutic handling of the condition.

The Sanitarium Methods of Treatment of the Sciatic Syndrome and Allied Conditions. VIRGIL C. KINNEY, M. D., Am. J. Electroth. & Radiol., 43:81-85, March, 1925.

FOR the adequate discussion for such a treatment, the writer presents a case report and includes the treatment instigated. The following applications are given each day, six days a week, by attendants:

1. *Incandescent light sweat.* The patient was placed in a cabinet for twenty to thirty minutes and the heat regulated so that sweating was produced at from 104 degrees Fahrenheit up to 115 degrees Fahrenheit.

2. *Salt glow massage and spray.* Following the sweat bath, the patient was sprayed and the body covered with coarse salt. The body was massaged vigorously for fifteen minutes, special attention being directed to the small of the back and to the affected leg. This was followed by a second spraying and a vigorous general massage.

3. *Deep therapy light with light massage.* This was administered over the back down the affected leg to the sole of the foot for fifteen to twenty minutes.

4. *Static wave current.* The sciatic nerve was treated with a small metal electrode, connected to a 32-plate static machine, for fifteen minutes, followed by a brush discharge the entire length of the nerve.

5. *Mechanical vibratory massage.* Along the course of the sciatic nerve, this was applied for twenty minutes.

6. *Low candle light therapy.* By means of an aluminum hood, under which was a ten watt tungsten bulb, heat was applied to the hip and leg for six to eight hours while the patient was sleeping at night.

Under the above treatment the report reads that the patient gradually improved. In four weeks the patient was using crutches, and in eight weeks he was doing his required amount of work per day, was sleeping all night, and was walking from six to eight miles daily.

SPECIAL SENSES

Radium Treatment in Diseases of the Eye and Adnexa. C. J. BROEMAN, M. D., Ohio State M. J., 21:257-263, April, 1925.

AFTER citation of the various experiments that have been carried on using rabbits, attempting to determine the biologic influence of radium on the eye, the author reports the production of no pathology. In an address to the Section of Radiology, British Medical Association in July, 1910, Dr. J. MacKenzie Davidson expressed the hope that there be more extensive use of radium, as it had proved of great service, both in the treatment of external diseases of the eye, as well as in diseases of the eyelids.

In a questionnaire recently submitted by the author to numerous practitioners, it was surprisingly learned that in conditions such as tuberculosis of the cornea, pterygium and other conditions which respond well to radium therapy, only two or three men of the entire six hundred had had any experience with this form of therapy.

The treatment of disease of the eye and adnexa that respond well to radium treatment may be divided into two classes: (1) Those that require superficial treatment, and (2) those that call for deep penetrating irradiation.

There seems to be but a few conditions that can be treated with the superficial beta radiation. The writer does not favor this form of treatment, as reactions tend to be more severe and are followed by more or less scarring and destruction of the tissues, which later become permeated with telangiectasis. If at any time it is found necessary to use the superficial beta rays, it is advisable that never more than one-half dose is given at one treatment. In the first cases that the author treated for vernal catarrh, unfiltered radiation was used. The reaction being very severe, a technique for filtered radiation was developed: The patient lying on his back, a few drops of a two per cent solution of cocaine are placed in the eye; the lid is then everted, it being held in place with adhesive plaster. The 10 milligram plaque, one-half strength, with a 0.3 millimeter filter and rubber dam, is then applied over the upper lid and held in place with adhesive plaster. If the case is a well marked one of spring catarrh, the plaque is allowed to remain *in situ* for two hours. At the end of four weeks the patient usually has a reaction which lasts for a week or two. This treatment is repeated at the end of two months when, as a rule, all reaction has subsided. If, instead of the 10 milligram plaque a brass tube containing 25 milligrams of radium in silver, or the equivalent amount in needles, is placed in a brass tube, the technique and duration of treatment here has been the same as for the plaque, as the brass tube is always covered with a layer of vulcanized rubber. Less reaction has been noted with the tube than with the plaque, and it may require one-half hour more time with the tube than with the plaque. It usually takes from four to six applications, such as described here, to effect a permanent cure. The writer has never failed to cure a case of vernal catarrh by this method, and finds sufficient encouragement for continuing to apply the filtered radium.

Among the conditions treated by the writer that have been attended with success are vernal catarrh, pemphigus of the eyelid, sarcoma, round cell sarcoma, xanthoma palpebrarum, blepharitis, solid edema of the right orbital cavity, sarcoma of the retina, sarcoma mucosa of the right upper lid, sarcoma of the right eyeball, postoperative sarcoma of the right orbit, epithelioma of both upper and lower lids, papilloma of the cornea, trachoma, melanotic sarcoma of the right cornea, moles, benign growths, trachoma and pamis, chronic ulcer of the right upper lid, granuloma of the iris, iritis, glaucoma melanotic sarcoma of the left orbit, chronic eczema of the outer canthus of both eyes, papilloma of the lids.

Vernal Conjunctivitis. MAXIMILIAN JOHN HUBENY, M. D., Radiol. Review, 1:50-52, 1924.

AFTER a careful review of the literature, the writer states that after treating six cases in the past nine years the most recent case two years ago, and after an accurate notation of the results obtained by other practitioners, in each case complete cure has been obtained and no recurrences occurred from the application of roentgen rays.

The technique consisted of the following factors: 9½ spark gap, 9 inches distance, 4 mm. aluminum filter, 5 milliamperes current, and six minutes' time exposure. This the writer states is equivalent to about 2/3 of an erythema dose. Four to six exposures were given at three-week intervals. Each eye was treated separately at one sitting, properly shielding the neighboring areas, first, to prevent an unexpected loss of eyelashes and eyebrows and, second, to maintain a safe biolog-

ical policy of not molesting or disturbing adjacent healthy tissues unnecessarily.

RESEARCH

Some Developments in Deep Radiotherapy. N. S. Finzi, M. B., D. M. R. E., Brit. Jour. Radiol., 21:67-79, April, 1925.

AFTER a discussion and constructive criticism of the various methods used in the application of deep therapy, the author suggests what he terms a *skimming* method for consideration. Applying this method to carcinoma of the breast, he states, "the usual plan of using a field of radiation at right angles to the skin is unsound for, even with the best conditions and the tube at 80 cm. from the skin, not more than about 80 per cent of a full dose is received by a tumor 3 cm. deep, while the skin itself receives an erythema dose. What I did, therefore, was to place a block of wax on the skin in order to obtain a homogeneous scattering medium and then apply my rays at a tangent to the ribs. If the tube is far enough away, 50 cm. will be sufficient with a penetrating radiation. It will be obvious that the radiation received by the tumor will be nearly as great as that received by the skin. It would be greater, but the lungs do not scatter the rays like the glass. In order to make more certain of getting the full dose, a small additional dose may be given from the back, insufficient to damage the lung. It will be seen that, by this method, only a small portion of the surface of the lung will be damaged. Its disadvantage is that it leaves the mediastinum entirely untouched by radiations. The supraclavicular and coracoid regions are treated at a separate sitting three months from the other, sometimes before it and sometimes after it, according to the position of the original growth. A similar method is employed, the tangent passing from front to back. In this treatment there will be little damage to the apex of the lung which, however, does not seem to cause any trouble. The two treatments overlap in the apex of the axilla and the coracoid regions but as these are the most likely sites of recurrence, this is an advantage."

"In practice, great care must be taken not to skim too much, and I am using an angle of 10 degrees to the tangent to avoid this.

"The results of this treatment in the last two and one-half years have been very encouraging. No radiographic evidence of lung damage can so far be made out in these cases, and the results are very definitely better than one used to obtain by the old methods. In the few cases where one has had the opportunity of treating a primary operable growth, one has seen this shrink into a small, hard mass, which has not altered for a considerable period. Naturally, cases where the mediastinum was proved to be infected were treated by different methods. The 'skimming' method has also been used for treating cases in other parts of the body, *e. g.*, parotid tumors."

Some Experiments on Induction Coils. J. A. Crowther, M. A., Sc. D., F. Inst. P., Brit. J. Radiol., 21:49-58, April, 1925.

IN this paper the author reports the results of experimentation, using two entirely different induction coils. One was a large 16-inch super intensified coil, while the other was a small oil immersion coil. "Very interesting differences were noted in the behavior of these two coils, and the experiments described in the present communication were made mainly with the object of elucidating these differences.... The secondary potential was measured by an electrostatic oscillograph, the current either in the primary or secondary circuit by a current oscillograph, while the x rays emitted were caused to register themselves on the same falling plate on which the oscillographs recorded."

Automatic Synchronization of Roentgen Ray Exposures. F. Maurice McPhedran, B. A., M. B., and Charles N. Weyl, B. S., Am. J. Med. Sci., 169:510-516, April, 1925.

ROENTGEN ray records of the heart and lungs lack in definition and in comparability, by means of cardiovascular movement. A mechanism is described by the authors by which exposures may be made at any selected phase of the cardiac cycle. Because of this mechanism systolic and diatolic cardiac outlines are reproducible at will; and pulmonary records can be obtained when cardiovascular movement is at a minimum.

Observations on the Use of the Radiotherm. E. L. Keyes, M. D., and Clyde W. Collings, M. D., J. Urology, 13:439-441, April, 1925.

RADIOTHERM is high frequency current obtained by an apparatus adapted from the radio machine. The oscillations are said

to be some 360,000 per second, about three times as rapid as the old high frequency current, and the slope of the one is correspondingly more abrupt, the peak more sharp. Observations of the authors have shown:

1. This radiotherm is more effective as a coagulent of bladder tumors than the old high frequency current.

2. It may be used in an operation as a cutting cautery. It cuts the ureteral orifice immediately. It may, for example, prove to be an instrument to perform bloodless prostatectomy.

3. It promises to be efficient as an electrode cautery for dividing the bladder neck.

4. It can be used in a sensitive region, as in the destruction of posterior ureteral granulations, much more painlessly than the old high frequency current.

On the Effect of Capacity on the Induction Coil. J. A. Crowther, M. A., Sc. D., F. Inst. P., and R. J. Stephenson, B. Sc., Brit. J. Radiol., 21:59-66, April, 1925.

"An examination of the corresponding oscillograms showed that the peak voltage was distinctly higher when the optimum capacity was employed. But the voltage in the secondary circuit is proportional to the rate at which the primary current is broken. The best condenser to employ seems thus to be the smallest which will produce an effective break in the primary circuit."

BOOKS RECEIVED

Pathology and Bacteriology of the Eye. By *E. Treacher Collins,* F. R. C. S., Consulting Surgeon to the Royal London Ophthalmic Hospital and Consulting Ophthalmic Surgeon to the Charing Cross Hospital, etc., and *M. Stephen Mayou,* F. R. C. S., Surgeon to the Central London Ophthalmic Hospital, etc. Cloth. Price $10.00. Second edition. Pp. 731. with 4 colored plates and 306 figures. Philadelphia: P. Blakiston's Son & Co.

The Principles and Technique of Oral Surgery. By *Adolph Berger,* D. D. S., Asst. Prof. of Oral Surgery, Columbia University; Chief of Clinic, Oral Surgery Dept., Vanderbilt Clinic; Instructor of Oral Surgery, Advanced Courses, University Extension, Columbia University, etc. Cloth. Price $7.00. Pp. 450, with 355 engravings. Brooklyn: Dental Items of Interest Publishing Co.

Conduction and Infiltration Anesthesia. By *Mendel Nevin,* D. D. S., Oral Surgeon, Greenpoint Hospital; Former Oral Surgeon Hospital Deformities and Joint Diseases: Ex-President Kings County Dental Society, etc. Cloth. Price $5.00. Pp. 313, with 190 illustrations. Brooklyn; Dental Items of Interest Publishing Co.

Photographic Exposure Calculator. A handbook and diary. Cloth. Pp. 236, with illustrations. New York: Burroughs Wellcome & Co., 1925.

Diseases and Injuries of the Rectum, Anus and Pelvic Colon. By J. Rawson Pennington, M. D., F. A. C. S., Proctologist Columbus Hospital, Veterans Hospital No. 30 and U. S. Marine Hospital; Past President American Proctological Society; Fellow Chicago Society Medical History, etc. Cloth. Price $12.00. Pp. 933, with two plates and 677 illustrations. Philadelphia: P. Blakiston's Son & Co., 1923.

The Chemical Action of Ultraviolet Rays. By Carleton Ellis and Alfred A. Wells. Cloth. Price $5.00. Pp. 362, with 85 illustrations. New York: Chemical Catalog Co., 1925.

Surgical Pathology. By William Boyd, M. D., M. R. C. P. Ed., F. R. S. C., Professor Pathology University Manitoba; Pathologist to Winnipeg General Hospital, Winnipeg, Canada. Cloth. Price $10.00. Pp. 837, with 349 illustrations and 13 colored plates. Philadelphia: W. B. Saunders Co., 1925.

BOOKS REVIEWED

Diseases of the Heart. By *Dr. Henri Vaquez,* Professor of the Faculty of Medicine of Paris. Translated and edited by *George F. Laidlaw,* M. D., Associate Physician to the Fifth Avenue Hospital, New York. Introduction by *William S. Thayer,* M. D., F. R. C. P. I., Prof. Emeritus of Medicine, Johns Hopkins University, etc. Cloth. Price $8.50. Pp. 743, with 146 illustrations. Philadelphia: W. B. Saunders Company, 1924.

After a most careful perusal of the text, the reviewer still feels highly incompetent to attempt to present to the readers the wealth of material and value of this treatise. We can do no better than to refer to the commendations made by Dr. Thayer, a widely recognized medical authority, in his introduction to this great work.

As to the competency of Professor Vaquez, Dr. Thayer reminds us that "Professor Vaquez was one of the most notable of the students and assistants of 'le pere Potain,' and into his studies and his writings he has carried much of the lucidity and simplicity which marked the contributions of his master." Much of our knowledge of cardiovascular disease we owe to French observers, and "Professor Vaquez's *Diseases of the Heart* presents the fruits of the ripe personal experience of the leading French student of diseases of the circulatory apparatus."

Dr. Thayer compares this edition with our medical classics when he says: "There is always a place for a treatise which represents the observation and judgment of one competent and experienced student. Systems come and go, but the rare book that presents the life work of one wise man holds for itself a permanent place in medical literature. Such works as Henoch's *Diseases of Children*, Trousseau's *Clinique de l'Hotel Dieu*, Flint's or Osler's *Practice of Medicine*, to mention but a few of the great textbooks of the last century, these are books to which we shall never cease to turn."

To briefly consider the scope of the text: A complete historical sketch of the development of the science of cardiology followed by a discussion of the anatomy and physiology of the heart and circulatory system introduces that which is to follow. The substance of the text is divided into five parts. In Part I, *methods of examination* of the heart are considered. The elements of physical examination, followed by radiology and graphic methods, are given individual, careful consideration. Part II exhaustively presents the etiology, pathology, symptomatology, diagnosis, differential diagnosis and prognosis of the various *cardiopathies and arterial hypertension*. The etiology, pathogenesis, types, mechanisms, evolution and clinical manifestation of the *arrhythmias* occupy Part III. *Heart Failure* is discussed exhaustively in Part IV. The functional efficiency test, causes, major symdromes, hypertrophy and dilatation and the complications of heart failure are separately considered. Part V is devoted to the *treatment* of cardiopathies. Treatment by physical agents, medicinal agents, in the period of adaptation, and of heart failure—all receive thorough and individual attention by the authority.

Each condition is preceded by a summary of the historical development of our knowledge concerning it, and is followed by a complete bibliographical summary.

The clinical pictures are characterized by their vividness, lucidity and simplicity in presentation. No better characterization of the text could be given than that spoken by Dr. Thayer in his introduction: "This volume is the offspring of an active life devoted to the study of the questions with which it is concerned. When we refer to its pages we consult the opinions of one of the most qualified and experienced men of his time.....and..... in bringing before the English speaking public this treatise on diseases of the heart by the leading authority of the present day in France, Dr. Laidlaw has rendered a service to American medicine for which we should be very grateful."

Roentgen Diagnosis and Therapy. By Arthur C. Christie, M. D., M. S., F. A. C. P., Prof. Roentgenology, George Washington University Medical College; Colonel, Medical Officers' Reserve Corps, U. S. Army; Professor Roentgenology and Operative Surgery, Army Medical School, Washington, D. C. Cloth. Price $6.00. Pp. 320, with 180 illustrations. Philadelphia: J. B. Lippincott Co., 1924.

Several years ago the author presented to the medical profession the Manual of X Ray Technique. The present text is an enlargement upon this manual, repeating the physical principles and properties of electricity and magnetism, the history and properties of the roentgen ray, the development of the roentgen tubes and emphasizing the apparatus and equipment employed today. In this work, the physics comprising the Manual is repeated, but stress is placed upon the interpretation, diagnosis and treatment of the various pathological conditions applicable to the roentgen ray.

The very foundation of success in the practice of roentgenology is good technical work, but a knowledge of the essentials of diagnosis and treatment is necessary for the practice of roentgenology. The author devotes chapters to the explanation of roentgenographic and dark room technique, and the localization of foreign bodies by roentgenoscopy.

The chapters on diagnosis are especially well illustrated, and are arranged by systems. After a consideration of the diseases and injuries of the bones and joints, the head, nasal

accessory sinuses, mastoid disease and brain tumors are discussed. Diseases of the chest, gastro-intestinal tract and urinary system receive special consideration.

Roentgenotherapy is discussed under two headings. The question of quantity, intensity and filtration of the rays is succeeded by a consideration of the measurement, skin unit or erythema, and repetition of the dose. Protective measures and idiosyncrasies are emphasized. The second portion is devoted entirely to a presentation of the technique of the author in the treatment of the diseases applicable to the roentgen ray.

The author is to be commended upon the arrangement and presentation of material practical for the understanding of both the student and practitioner. The information correlated by the writer in this text is essential for the medical practitioner whose ideal is to dispense to his patients all that medical knowledge has to offer. This book is a valuable addition to roentgenologic literature.

The Advance of Orthopaedic Surgery. By A. H. Tubby, C. B., C. M. G., M. S. Lond., F. R. S. C., Eng., F. S. A. Cloth. Pp. 144, with 31 illustrations. New York: Macmillan Co., 1924.

The advance of orthopaedic surgery has been greatly facilitated by radiography. By the development and application of the science of radiography, the problems of the orthopaedic surgeon have been greatly simplified. Not only an aid in the recognition of diseases which had heretofore escaped unrecognized, but in the differentiation of diseased states and in the determination of the progress and results of the treatment, the roentgen ray has proven iself invaluable.

By its aid orthopaedic diseases have been classified:

I. *Congenital and Growth Deformities* include not only the congenital deformities of the spine, but sacralization of the lumbar vertebrae, spondylolisthesis, Legg's Disease, Osgood-Schlatter's Disease and others too numerous to mention.

II. *Static and Posteural Conditions* comprise the consideration of symmetry and asymmetry, posteural defects and health, and orthopaedic albuminuria.

III. The question of *Infantile and Spastic Paralysis* considers poliomyelitis and Little's Disease—their diagnosis and treatment.

IV. *Reconstruction, Regenerative and Recreative Surgery* has come to occupy an important place in the solution of many of our social and industrial problems.

V. The *re-education* of these men in the application of their new powers is a problem confronting every conscientious orthopaedic surgeon. Special attention and commendation of the science of heliotherapy as supervised by Dr. Rollier of Leysin is given by the writer.

The future of orthopaedic surgery depends a great deal upon those who are presenting the subject to the medical student.

Differential Diagnosis of Internal Medicine. By M. Matthes, M. D., Prof. Medicine and Director of the Medical Clinic, University of Konigsberg. Fourth German edition translated by I. W. Held, M. D., and M. H. Gross, M. D. Cloth. Price $12.00. Pp. 908, with 176 illustrations, some in colors. Philadelphia: P. Blakiston's Son & Co., 1925.

Prof. M. Matthes' text on the differential diagnosis of diseases of internal medicine has for many years been the recognized text in many of the German medical schools. The English translation of the fourth edition, supplemented by American methods and observations, renders it a most valuable addition to our armamentarium for the establishment of a correct diagnosis. Its concise yet complete presentation of each individual subject, with the exception of diseases of the nervous system, makes it more valuable to the busy practitioner.

After emphasizing the subjective and objective symptoms presented by each particular disease considered, the authors considered those conditions with which it may be confused and emphasized the known differential points. Hazy, indefinite, impractical differential points are disregarded.

The entire subject is covered in twenty-four chapters, including the acute and chronic febrile infectious diseases; the various meningeal and peritoneal symptom-complexes; ileus and intestinal stenosis; diseases of the larynx, trachea and smaller bronchi; infiltration, cavity formation, tumors and cysts of the lungs; diseases of the pleura; circulatory diseases; diseases of the spleen; gastro-intestinal diseases and their glandular diverticuli; urinary diseases; metabolic and endocrine glandular diseases; chronic joint and osseous diseases;

neuralgias and neuralgic-like pains, and the differential diagnosis of headache.

The viewpoint constantly maintained by the authors is that of a busy practitioner who, having carefully evaluated the information received from the history, physical findings and accessible laboratory data, organizes his findings and considers the possibilities for establishing the correct diagnosis. One by one these possibilities are eliminated and the pathological condition determined.

For the practitioner or medical student, this text should be a valuable reference and guide for the scientific evaluation and recognition of the symptom complex.

Practical Medical Series, 1924. Vol. III. *Eye, Ear, Nose and Throat.* Edited by *Casey A. Wood*, C. M., M. D., D. C. L.; *Charles P. Small*, M. D.; *Albert Andrews*, M. D.; *George E. Shambaugh*, M. D. Under general editorial charge of Chas. L. Mix, A. M., M. D. Cloth. Price of this volume $2.00, and of the eight volume series, $15.00. Pp. 491, with 47 plates and illustrations. Chicago: Year Book Publishers.

The standard established by the preceding volumes is aptly maintained in this number. With diseases of the eye discussed by Casey A. Wood and Charles P. Small, pathologies of the ear reviewed by Albert H. Andrews and conditions in the nose and throat considered by George E. Shambaugh, this text contains a wealth of material from the current medical literature published in 1924.

To date there is one criticism that might be made of all these volumes reviewed so far. The authors who have reviewed the literature in compilation of these texts could greatly increase upon the value of these texts by concluding their reviews with summaries that give personal observations and opinions of the questions under consideration. Those who compile the texts are surely better fitted to judge the applicability and practicability of these new observations than the majority of their readers, and their judgments would be greatly appreciated.